United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Spokane District
Wenatchee Field Office
915 Walla Walla Avenue
Wenatchee, Washington 98801

IN REPLY REFER TO:
2850 (ORW020)
WAOR 65753

January 4, 2013

Dear Reader:

Enclosed for your review is the Draft Environmental Impact Statement (DEIS) for the Vantage to Pomona Heights 230 kV Transmission Line Project (Project). The Bureau of Land Management (BLM) prepared the DEIS in consultation with cooperating agencies to analyze the effects of granting, granting with conditions, or denying Pacific Power's (the Applicant) right-of-way applications to construct, operate and maintain a 230 kilovolt (kV) transmission line, associated access roads, and other ancillary facilities. The U.S. Army - Joint Base Lewis-McChord Yakima Training Center (JBLM YTC), U.S. Bureau of Reclamation, Bonneville Power Administration (BPA) , and Grant and Yakima Counties are cooperating agencies and assisted with the preparation of this DEIS.

The Project area is situated in south-central Washington State, extending from BPA's Vantage substation, just east of Wanapum Dam in Grant County, to Pacific Power's Pomona Heights substation near Selah, Washington. A total of eight transmission line route alternatives are considered in the DEIS, along with the "No Action" alternative. The eight end-to-end route alternatives range from 61 to 67 miles in length and cross portions of Benton, Grant, Kittitas, and Yakima Counties.

The DEIS is not a decision document. Instead, its purpose is to inform the public and interested parties of impacts associated with implementing the Applicant's proposal as associated with granting rights-of-way to construct, operate, maintain, and decommission transmission facilities across federal lands. This DEIS also provides information to other regulatory agencies for use in their decision making process for other permits required for implementation of the project.

The DEIS is available for review online at:
http://www.blm.gov/or/districts/spokane/plans/vph230.php

and also at the following locations during regular business hours:

- Mattawa Community Library; 101 Manson Lane, Mattawa, Washington (509) 932-5507

- Terrace Heights Library; 4011 Commonwealth Rd, Yakima, Washington (509) 457-5319

- Bureau of Land Management; Wenatchee Field Office, 915 Walla Walla Ave, Wenatchee, Washington (509) 665-2100

- Bureau of Land Management; Spokane District Office, 1103 N. Fancher Rd., Spokane Valley, Washington (509) 536-1200

Additional compact disks containing the DEIS are available at the BLM Wenatchee Field Office at the address listed on the letterhead.

The BLM is soliciting written comments on the DEIS. To ensure that your written comments are considered, the BLM must receive them within 45 days following the date the Environmental Protection Agency publishes its Notice of Availability in the *Federal Register*. Publication of the Notice of Availability and the beginning of the comment period is scheduled to begin on January 4, 2013 and will end on February 19, 2013. The BLM will host open house public meetings in Mattawa and Selah, Washington during the comment period. The meetings will provide an overview of the Project and take public comments on the proposed Project and DEIS. The public meetings will be announced by the BLM at least 15 days in advance through the BLM web site, public notices, local media news release, and/or mailings.

Comments related to the Vantage to Pomona Heights 230 kV Transmission Line Project DEIS may be submitted by any of the following methods:

- Online at: http://www.blm.gov/or/districts/spokane/plans/vph230.php

- By email to: OR_Wenatchee_Mail@blm.gov (please specify Vantage to Pomona Heights EIS in the subject line)

- By mail to: BLM Wenatchee Field Office, Attn: Vantage to Pomona Heights EIS, 915 Walla Walla Avenue, Wenatchee, Washington 98801-1521

- By fax: (509) 665-2121, Attention Vantage to Pomona Heights EIS Project Manager

- Written comments may also be hand delivered to the BLM Wenatchee Field Office (address listed above) between 8:00 a.m. and 4:00 p.m. Monday through Friday, excluding federal holidays.

Comments on the DEIS should be as specific as possible. It also would be helpful if comments referred to pages, chapters, and/or sections of the DEIS. Comments may address the adequacy of specific analyses in the DEIS, and the merits of the alternatives formulated and discussed in the document (refer to Council on Environmental Quality regulations at 40 Code of Federal Regulations (C.F.R.) 1503.3).

For all comments submitted, please identify whether you are submitting them as an individual or as the designated spokesperson on behalf of an organization. All comment submittals must include the commenter's name and address. However, before including your address, phone number, e-mail address, or other personal identifying information in your comment, *you should be aware that your entire comment-including your personal information-may be made publically available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.*

For further information, contact the Vantage to Pomona Heights EIS Project Manager at the BLM's Wenatchee Field Office, telephone (509) 665-2100, or at the address shown above.

We appreciate your interest in public land management and look forward to receiving your comments on the DEIS.

Sincerely,

Linda Coates-Markle
Field Manager

Enclosure

Draft Environmental Impact Statement for the Vantage to Pomona Heights 230 kV Transmission Line Project

DOI-BLM-OR-134-2013-0002-EIS

BLM

WENATCHEE FIELD OFFICE

JANUARY 2013

U.S. Department of the Interior
Bureau of Land Management

Draft Environmental Impact Statement for the Vantage to Pomona Heights 230 kV Transmission Line Project

DOI-BLM-OR-134-2013-0002-EIS
Case File: WAOR 65753

Spokane District
Wenatchee Field Office
915 Walla Walla Avenue
Wenatchee, WA 98801

Cooperating Agencies
U.S. Army Joint Base Lewis-McChord Yakima Training Center
Bureau of Reclamation
Bonneville Power Administration
Yakima County
Grant County

January 4, 2013

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
SPOKANE DISTRICT

EIS #:	DOI-BLM-OR-134-2013-0002-EIS
Project Name:	Vantage to Pomona Heights 230 kV Transmission Line Project Draft Environmental Impact Statement
Lead Agency	U. S. Department of the Interior Bureau of Land Management Spokane District, Wenatchee Field Office, Washington
Cooperating Agencies:	U. S. Army Joint Base Lewis-McChord Yakima Training Center Bureau of Reclamation Bonneville Power Administration Yakima County Grant County
Project Location:	Benton, Grant, Kittitas and Yakima Counties, Washington
BLM Contact Person:	William Schurger BLM Wenatchee Field Office 915 Walla Walla Avenue Wenatchee, Washington 98801 509-665-2100 wschurge@blm.gov
Applicant:	Pacific Power c/o John Aniello; Project Manager 825 NE Multnomah, Suite 1700 Portland, Oregon 97232 (503) 813-6030 john.aniello@pacificorp.com

Abstract:
This Draft Environmental Impact Statement (EIS) considers the Proposed Action of authorizing a right-of-way across lands administered by the Bureau of Land Management (BLM), U. S. Army Joint Base Lewis-McChord Yakima Training Center (JBLM YTC), and the Bureau of Reclamation (Reclamation) for the construction and operation of a transmission line and access roads associated with the Vantage-Pomona Heights 230 kV Transmission Line Project. This Draft EIS considers nine alternatives: Alternative A, Alternative B, Alternative C, Alternative D, Alternative E, Alternative F, Alternative G, Alternative H, and the No Action Alternative. The following issues were identified for analysis in the Draft EIS based on public scoping: potential impacts on sage-grouse populations and habitat, and special status wildlife species and protected birds; avian collision potential; effects on vegetation; sagebrush and native grassland communities disturbance types and levels; endangered and threatened plant species effects; introduction, spread and control of noxious weeds; impacts on cultural resources, prehistoric and historic sites; impact to aerial spraying and the use of helicopters to dry cherry orchards; safety hazard on farm workers and equipment from inducted current; impact on GPS, cell phones, and other equipment; electric and magnetic field health effects; effects on agricultural systems, center-pivot irrigation and electronics used in farm equipment; impacts on residential areas and planned development; effects on productive or revenue generating state lands; amount and types of impact on agricultural land, production, equipment and aerial spraying; affect on recreational areas and opportunities; impact on Native American Tribal cultural properties; financial impacts to farming and agricultural operations; effect on property values; effects on low-income and minority populations or communities; potential for increased public access on access roads; private property aesthetic impacts; effects on BLM Visual Resource Management objectives; affects on fire management/suppression activities and risk of wild fire; and impacts on JBLM YTC training operations.

EXECUTIVE SUMMARY

This Executive Summary provides a synopsis of the Vantage to Pomona Heights Transmission Line Project Draft Environmental Impact Statement (Draft EIS). The Draft EIS describes the Agency Preferred Alternative, alternatives to the Agency Preferred Alternative and discusses the potential effects of the Agency Preferred and alternatives on the human and natural environment. The Draft EIS has been distributed to interested persons in hard copy and compact disk (CD) format, and hard copies are available for review at the U. S. Department of the Interior Bureau of Land Management (BLM) Spokane District Office and Wenatchee Field Office, local libraries, and other locations as specified in Section 5.4.

INTRODUCTION

Pacific Power, a regulated utility serving 730,000 customers in Oregon, Washington, and northern California, filed separate right-of-way applications (SF-299) with the BLM Spokane District Office and U.S. Army Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) in October 2008 for the construction, operation and maintenance of a new single-circuit 230,000 volt (230-kilvolts or 230 kV) overhead electric transmission line and associated facilities on BLM-administered land in Yakima, Kittitas, Benton, and Grant Counties in south-central Washington. The proposed transmission line, known as the Vantage to Pomona Heights 230 kV Transmission Line Project, would extend from the existing Bonneville Power Administration (BPA) Vantage substation located east of the Wanapum Dam in Grant County, Washington to Pacific Power's existing Pomona Heights substation located east of Selah in Yakima County, Washington. In addition to filing applications with BLM and JBLM-YTC, Pacific Power has submitted an interconnection request to BPA to interconnect the proposed new transmission line to BPA's Vantage substation.

The proposed Project would eliminate redistributed loads and the overloading of the adjacent transmission system and would ensure continued reliable and efficient service to the Yakima Valley, and would address potential reliability issues within the Mid-Columbia transmission system. As a result of studies conducted by Mid-Columbia utilities including BPA, Grant County Public Utility District (PUD), Chelan County PUD, PacifiCorp, and Puget Sound Energy worked together with the Northwest Power Pool (NWPP) - Northwest Transmission Assessment Committee (NTAC) to perform a detailed screening of the transmission system exposure to overloading. System reinforcement projects or upgrades were identified to address system conditions and overloading. The proposed Vantage to Pomona Heights 230 kV Transmission Line Project was one of the reinforcement projects that were identified for Grant, Benton, and Yakima counties to ensure reliability of the transmission network in the Mid-Columbia area.

The BLM is serving as the lead agency, with the JBLM YTC, Bureau of Reclamation (Reclamation), BPA, Grant County and Yakima County serving as cooperating agencies. Because the development of the Vantage to Pomona Heights 230 kV Transmission Line Project is dependent upon federal approval of a right-of-way (ROW) grant for the transmission line across federal lands, the BLM will decide whether to grant, grant with conditions, or deny the application for a new ROW. Pursuant to 43 Code of Federal Regulations [C.F.R.] 2805.10, if BLM issues a grant, the BLM decision maker may include terms, conditions, and stipulations which she or he determines to be in the public interest. This includes modifying the proposed use or changing the route or location of the facilities on public land. The BLM's need for action, to respond to Pacific Power's ROW application, arises from the Federal Land Policy and Management Act of 1976 (FLPMA) which establishes a multiple use mandate for management of federal lands, including energy generation and transmission facilities as outlined in 43 C.F.R. 2800. Upon reviewing the scope of the proposed Project and the ROW applications, the BLM and JBLM YTC determined that the proposed Project constituted a major federal action and requires the preparation of an EIS in accordance with the National Environmental Policy Act (NEPA).

This Draft EIS considers nine alternatives: Alternative A, Alternative B, Alternative C, Alternative D, Alternative E, Alternative F, Alternative G, Alternative H, and the No Action Alternative. The route alternatives considered in this EIS range from 61.0 to 66.7 miles in length. As proposed by Pacific Power, most of the proposed transmission line would be constructed on H-frame wood pole structures between 65 and 90 feet tall and spaced approximately 650 to 1,000 feet apart depending on terrain, with single wood pole or steel monopole structures used in developed or agricultural areas. The single pole structures would be between 70 and 110 feet tall and spaced approximately 400 to 700 feet apart. The ROW width for the H-frame structure type would be between 125 to 150 feet and for the single pole structure type between 75 to 100 feet. In addition to the transmission line, upgrades would occur to the Pomona Heights substation located east of Selah and the Vantage substation located east of the Wanapum Dam.

ALTERNATIVES

This Draft EIS considers eight end-to-end alternatives: Alternative A, Alternative B, Alternative C, Alternative D, Alternative E, Alternative F, Alternative G, and Alternative H, and the No Action Alternative. A total of ten Route Segments were analyzed in this Draft EIS (1a, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, and 3c). Each of the action alternatives are comprised of a particular combination of seven Route Segments chosen among the ten, with four of the Route Segments being common to all action Alternatives (1a, 2a, 2d, and 3a). Alternative D is the Agency Preferred Alternative. See Figure 2-2 and Section 2.3 in Chapter 2 for a diagram and discussion of the end-to-end alternatives.

ENVIRONMENTAL IMPACTS

Environmental impacts of the alternatives are related to: vegetation and special status plants; sage-grouse and their habitat; agricultural, residential, and military land uses; recreational activities and the displacement of recreational land uses; the visibility of the transmission line and roads from sensitive viewers; scenic views and change in natural scenery; potential incompatibility with the visual character of existing development; transportation and roadway systems; archeological resources and properties listed on the National Register of Historic Places; sensitive Native American areas and uses; communities and landowner economic effects; public health and safety; climate and global warming; and Special Management Areas. Impacts are identified considering the implementation of project design features (PDFs) and selective mitigation measures where applicable as discussed in Chapter 2 and Chapter 4.

Vegetation

Construction of Alternative C would disturb the smallest amount of vegetation. The greatest amount of disturbance to vegetation would be for Alternative F. Alternative G has the fewest miles of moderate impact, while Alternative A has the most miles of moderate impact. Alternatives D (Agency Preferred Alternative) and H would cross the fewest miles of Washington National Heritage Program (WNHP) special status plant polygons, while Alternatives B and E would cross the greatest number of miles of these polygons. Alternative H crosses the fewest miles and Alternative B crosses the most miles with special status plants found during vegetation surveys. One NHP priority ecosystem is crossed by Alternatives A, D, F, and H.

Wildlife

Alternatives F and H cross the fewest miles of Priority Species Regional Areas and the highest miles of Priority Species Regional Areas would be crossed by Alternatives B and C. Alternatives A and F have the lowest number of miles with nest points occurring within one mile, while Alternatives C and G cross the highest number of miles. Alternative G crosses the fewest miles of highly sensitive habitats, while Alternative A crosses the most. Alternative A would disturb a nominal amount of highly sensitive habitats present within the Project area. Overall, no high impacts would occur with any of the end-to-end alternatives. Alternative B would have the highest number of miles with moderate impacts and Alternative H would have the lowest.

Alternative A crosses the most miles of suitable habitat for sage-grouse and Alternative G crosses the fewest. No active or inactive leks occur within 0.6 mile of any of the end-to-end alternatives. Alternatives B and E have the most active or inactive leks occurring within 2 miles. Overall, no high impacts would occur with any of the end-to-end alternatives. Alternative B would have the highest miles of moderate impacts to sage-grouse and its habitat and Alternative H would have the lowest miles of moderate impacts.

Land Use, Recreation, Visual and Transportation

Alternatives E, F, G, and H would have the greatest impact on residential land uses and Alternatives A, B, C, and D (Agency Preferred Alternative) would have the least amount of long-term disturbance. Alternative H would have the greatest impact on irrigated and dryland agriculture and Alternative B would have the least impact on irrigated and dryland agriculture. Alternatives B and C would have the greatest impacts on military lands, and Alternatives F and H would have the least. State grazing leases would be most affected under Alternatives C, D (Agency Preferred Alternative), G, and H and would not be affected under Alternatives A, B, E, and F. BLM grazing leases would be most affected under Alternatives A and F, and least affected under Alternatives C and G. Overall, Alternative H would have the greatest mileage of high impacts on land uses and Alternative B would have the least. Alternative D (Agency Preferred Alternative) would have the highest mileage of moderate land use impacts and Alternative E would have the least.

The mileage of moderate impacts on recreation resources would be highest and identical for Alternatives B, C, E, and G. The greatest mileage of low impacts to recreational uses would occur for Alternative F, and the fewest would be for Alternative C. The greatest mileage of no identifiable impacts on recreation resources would be for Alternative F. Alternative D (Agency Preferred Alternative) would be tied with Alternatives A, F, and H in having the least amount of moderate impacts, and Alternative D (Agency Preferred Alternative) would have the second lowest amount of low impacts to recreation resources.

Alternative C would require the least distance of new roads and Alternative F would require the most. Use of a JBLM YTC road for access on state, private and BLM lands adjacent to the installation would result in approximately 6.4 miles less road construction for Alternatives A and B, 9.6 miles less of new road construction for Alternatives E and F, and 3.2 miles less new road construction for Alternatives G and H. Impacts for all alternatives would be moderate to low.

Alternative G would cause the highest total mileage of high visual impacts, and Alternative A would cause the lowest mileage of high visual impacts. High impacts on residences would be highest for Alternative H and lowest for Alternative B. The mileage of high impacts on high sensitivity recreational and travel corridor viewers would be identical and highest for Alternatives B, C, E, and G, and identical and lowest for Alternatives A, D (Agency Preferred Alternative), F, and H. Alternatives F and H would have the fewest miles of high impacts on moderate sensitivity recreational and travel viewers. Alternatives B, C, E, and G would be identical and have the fewest miles of high impacts on scenic quality, and Alternative D (Agency Preferred Alternative) would have the fewest miles of moderate impacts on scenic quality. All Alternatives would be compliant with Interim BLM Visual Resource Management Class III designation, with 100 percent of BLM lands crossed for the Alternatives being compliant.

Socioeconomics and Environmental Justice

Socioeconomic impacts on the Study Region economy would be predominantly beneficial, as job opportunities increase with any of the Project Alternatives. Impacts as a whole would not perceptively vary among Alternatives. This lack of distinction arises because the scale of construction (duration, employment, and purchases of local goods and services) varies by very little between alternatives. Alternative Route G would result in the most property tax payments and Alternative A the least. For each Alternative Route, Yakima County would obtain by far the largest property tax income, from $195,000 (Alternative Route A) to $231,000 (Alternative Route G), depending on the Alternative Route.

No significant impacts on minority or low-income populations are expected with implementation of any of the Project Alternatives. Although some of the Census Block Groups within three miles' proximity of the Alternative Routes do contain substantial populations of minority and low-income populations, appreciable concentrations of such populations are more distant than about a mile, limiting the potential impact of the Project Alternatives to no more than minimal, and not significant. Differences in impacts among Alternative Routes would be extremely small.

Cultural Resources and Native American Concerns

Cultural resources were inventoried at 75 feet and 250 feet from the assumed route centerlines of all alternatives. Alternatives B, C, E, and G each have the greatest number of cultural resources within the 75 foot corridor, including 43 archaeological resources, one archaeological district, three isolated finds, and architectural resources. The fewest cultural resources are found within 75 feet of Alternatives A, D (Agency Preferred Alternative), F, and H, each with 16 resources. The greatest number of cultural resources within 250 feet occurs along Alternatives B, C, E, and G. Alternative H has the fewest cultural resources within 250 feet of the centerline.

It has been assumed that visually sensitive resources include those with burials, rock features (cairns, alignments), talus pits, rock art (pictographs and petroglyphs), and rockshelters. The greatest numbers of these types of resources are found along Alternatives B, C, E, and G, and therefore these have the highest potential for visually sensitivity.

Overall, alternatives that include Route Segment 3b (Alternatives B, C, E, and G) would have higher impacts to sites of Native American concern than alternatives that include Route Segment 3c (Alternatives A, D, F, and H).

The Yakama Nation Cultural Resource Program has reported that there are many resources of special concern to Native Americans along Alternatives B, C, E, and G. In addition, the Yakama Nation Tribal Council Lands Committee and Cultural Committee have passed resolutions expressing opposition to alternatives that include Route Segment 3b (Alternatives B, C, E, and G). Impacts to resources of special concern to Native Americans associated with these alternatives would be high.

There are several resources of special concern within three miles of Alternatives A, D, F, and H (Route Segment 3c). Although TCPs have been identified along Alternatives A, D, F, and H, these alternatives would have fewer impacts than those involving Route Segment 3b. Overall, alternatives that include Route Segment 3b (Alternatives B, C, E, and G) would have higher impacts to sites of Native American concern than alternatives that include Route Segment 3c (Alternatives A, D, F, and H).

Wildland Fire

The impact analysis for wildland fire ecology and management focused on whether the proposed Project would alter the effectiveness of firefighting, would increase the risk of a wildfire event, and increase ignition potential. Alternative B has the highest number of miles with low impacts and the lowest number of miles with moderate impacts. Alternative H has the highest number of miles with moderate impacts and the lowest number of miles of low impacts. High impact levels are not anticipated for any of the end-to-end alternatives.

Water Resources

Long-term disturbance to water resources is lowest for Alternative D (Agency Preferred Alternative) and highest for Alternative E. Differences in impact levels are very similar for all of the end-to-end alternatives, with most of the impacts categorized as no identifiable or low. Alternative B has the lowest number of miles of moderate impacts, while Alternative H has the highest number of miles of moderate impacts. No high impacts to water resources are anticipated for any of the end-to-end alternatives.

Geology and Soils

All of the Alternatives are similar in their impacts to geologic and soil resources, with low impacts occurring along most of each of the Alternative length. In general, Alternatives B and C would have the greatest percentage of their total mileage with moderate impacts to geological and soil resources. Alternatives F and H would have the greatest percentage of low impacts to soils and geology. Alternative E would cross the greatest distance of high landslide hazard area and Alternative D (Agency Preferred Alternative) would cross the least amount of high landslide hazard area.

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APPENDICES

FIGURES

TABLES

CHAPTER 1 PURPOSE AND NEED

This Environmental Impact Statement (EIS) discloses potential project-related impacts pursuant to the requirements of National Environmental Policy Act of 1969 (NEPA) as amended (42 United States Code [U.S.C.] §§ 4321, et seq.) and subsequent regulations issued by the Council on Environmental Quality (CEQ) implementing NEPA (40 Code of Federal Regulations [C.F.R.] 1500 through 1508). The EIS was prepared in conformance with the Bureau of Land Management (BLM) NEPA Handbook (BLM Handbook H-1790-1) and the U.S. Department of the Interior's Manual on NEPA (516 DM 1-7), which provides instructions for compliance with the CEQ regulations for implementing the procedural provisions of NEPA.

This EIS will be used to make a decision regarding Pacific Power's Application for Transportation and Utility Systems and Facilities on federal lands (SF-299), submitted to the BLM on October 31, 2008 (case file #WAOR 65753) and amended by Pacific Power on November 5, 2010.

Chapter 1 provides the context for the EIS by describing background information on the proposed Project, including the applicant's objectives for the Project, the BLM's purpose and need for the action, and a summary of issues and concerns to be analyzed in the subsequent EIS chapters.

1.1 SUMMARY OF THE PROPOSED PROJECT

Pacific Power proposes to construct, operate and maintain a new 230 kilovolt (kV) transmission line from Pacific Power's Pomona Heights substation located just east of Selah, Washington in Yakima County to the Bonneville Power Administration (BPA) Vantage Substation located just east of the Wanapum Dam in Grant County, Washington. Figure 1-1 shows the location of the Project within the State of Washington and Figure 1-2 shows the Project study area and the location of the Pomona Heights and Vantage Substations.

The route alternatives considered in this EIS range from 61 to 67 miles in length. The route alternatives cross federal land managed by the BLM, the Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) and the Bureau of Reclamation (Reclamation). Some of the route alternatives cross State of Washington land administered by the Washington State Department of Natural Resources (WDNR). There are four counties that are crossed by various route alternatives: Yakima, Grant, Kittitas and Benton County.

As proposed by Pacific Power, most of the transmission line would be constructed on H-frame wood structures between 65 and 90 feet tall. In developed or agricultural areas single wood or steel monopole structures between 80 and 110 feet tall would be used. The transmission line would cross the Columbia River either near BPA's existing Midway Substation or below the Wanapum Dam on steel lattice structures approximately 200 feet tall. The existing Pacific Power Pomona Heights substation and the existing BPA Vantage substation would be upgraded with installation of new equipment to interconnect the new 230 kV transmission line to the regional electric grid.

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Vantage - Pomona Heights 230kV Transmission Line Project

Project Location

Figure 1-1

Project Features

Study Area

Base Features

State Boundary

County Boundary

Transportation

Interstate Highway

Water

Major River

Lake or Ocean

0 10 20 30 40 50 60 70 80

Miles

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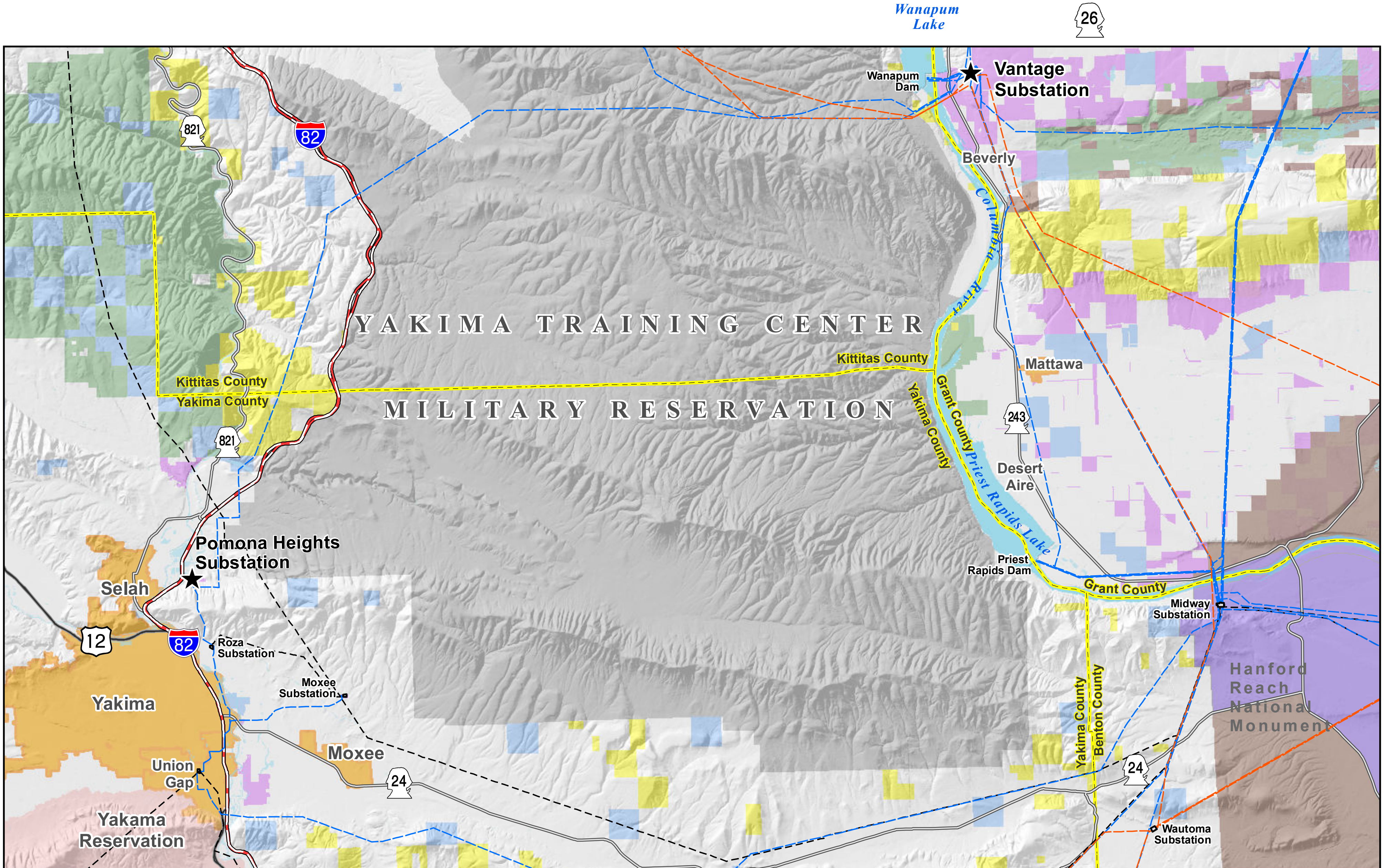


Vantage - Pomona Heights 230kV Transmission Line Project

Figure 1-2 Project Study Area

Project Features
- Project Substation

Existing Transmission
- 500 kV Transmission
- 230 kV Transmission
- 115 kV Transmission
- Substation

Transportation
- Interstate Highway
- US Highway
- State Highway

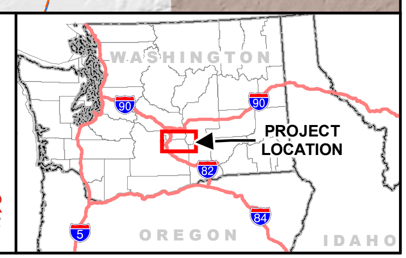
Base Features
- County Boundary
- Municipality

Jurisdiction
- Private Individual or Company
- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation
- Washington Department of Fish and Wildlife
- State of Washington
- Yakima Training Center (DOD)
- U.S. Fish and Wildlife Service
- Department of Energy

0 1 2 3 4 5 6 7 8
Miles

PACIFIC POWER
A DIVISION OF PACIFICORP

POWER ENGINEERS



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1.2 BACKGROUND

1.2.1 Proponent

Pacific Power is part of PacifiCorp with 1.7 million customers in six western states. Pacific Power provides electric service to almost 730,000 customers in Oregon, Washington, and northern California. Pacific Power, as a regulated utility, is required to provide safe and reliable service for all customers within its service territory.

1.2.2 Third-Party Contractor

POWER Engineers (POWER), a third-party consultant, is assisting with the preparation of this EIS. POWER has certified that it does not have any financial or other interest in the decisions to be made pursuant to this EIS.

1.2.3 Regional Transmission System Study

The Western Electricity Coordinating Council (WECC), in conjunction with the North American Electric Reliability Corporation (NERC), has established System Planning and Operating Criteria that all transmission providers within the Western Interconnection must follow when planning and operating their transmission systems (NERC/WECC 2005; WECC 2008; NERC 2009). These standards and criteria require transmission providers to evaluate expected normal and potential abnormal operating conditions and plan adequate redundancy in the system (e.g., provided through construction of multiple transmission lines; and locating multiple lines in wide geographically diverse transmission corridors) to meet expected system reliability performance. These standards and criteria define both the expected level of event severity (single and multiple line outages) and acceptable performance requirements. In part, the standards require transmission providers to evaluate multiple adjacent outages and when applicable, the outage of all lines in a corridor to ensure the outage does not result in a cascading and uncontrolled loss of generation stations and outages of customer loads. While these standards and criteria exist for performance and reliability, it is the responsibility of the transmission provider, based on operational history and experience, to plan, design, and site transmission projects to meet system performance requirements and manage reliability, risks and costs.

In 2007, Pacific Power participated in a regional transmission system planning study to address reliability issues within the Mid-Columbia transmission system. To address these problems, the Mid-Columbia utilities including BPA, Grant County Public Utility District (PUD), Chelan County PUD, PacifiCorp, and Puget Sound Energy worked together with the Northwest Power Pool (NWPP) - Northwest Transmission Assessment Committee (NTAC) to perform a detailed screening of the transmission system exposure to overloading (NTAC 2007). As a result of the study, system reinforcement projects or upgrades were identified to address system conditions and overloading. The proposed Vantage to Pomona Heights 230 kV Transmission Line Project (Project) was one of the reinforcement projects that were identified for Grant, Benton, and Yakima counties to ensure reliability of the transmission network in the Mid-Columbia area.

The study determined that loss of the existing Pomona-Wanapum 230 kV transmission line would result in a significant load shedding exposure on the transmission system, and would also impact other transmission providers in the Mid-Columbia area with overloads of existing transmission components. Based on 2007 loads and system activity during high load periods in the Yakima Valley, loss of the Pomona-Wanapum 230 kV transmission line would result in the need to shed up to 167 megawatts (MW). This load shed would occur through five different substations and would represent 33 percent of the 500 MW load in the Yakima area.

The regional transmission study showed that an outage of the Pomona-Wanapum 230 kV transmission line would result in redistribution of electrical flow across the BPA and Grant County PUD parallel transmission systems that also feed into Pacific Power's Yakima load area. This redistribution would result in loadings well above the acceptable limits of many existing transmission components on the other systems, putting the regional transmission system at risk of failure. The transmission system planning studies determined that an outage of the Pomona-Wanapum 230 kV transmission line would result in the overload of three Pacific Power high voltage transmission lines and two BPA high voltage transmission lines, potentially causing service interruptions in the Yakima Valley. The regional planning study showed that the addition of a Vantage to Pomona Heights 230 kV transmission line would eliminate the redistributed loads and the overloading of the adjacent transmission system, and would ensure continued reliable and efficient service to the Yakima Valley.

In October 2008, Pacific Power filed separate right-of-way (ROW) applications (SF-299) with the BLM and U.S. Department of the Army (Army) JBLM YTC to request grants of ROW across federal lands for the transmission line project. Upon reviewing the scope of the proposed Project and the ROW applications, the BLM and JBLM YTC determined that the proposed Project constituted a major federal action and would require the preparation of an EIS in accordance with NEPA.

1.3 LEAD AND COOPERATING AGENCIES

1.3.1 Bureau of Land Management

It is the mission of the BLM to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations. The BLM Wenatchee Field Office (WFO) is the lead federal agency responsible for preparation of this EIS and project oversight and compliance with the requirements of NEPA and other applicable laws and regulations. The BLM WFO Field Manager is the federal official responsible for the decision on whether to issue the requested BLM ROW and, if issued, the applicable terms, conditions, or other stipulations. In the decision process, the BLM WFO must consider how the BLM's resource management goals, objectives, opportunities, and/or conflicts relate to this non-federal use of public lands. Section 1.7 provides more discussion on the BLM WFO's consideration of current Resource Management Plan (RMP) guidelines, including plan conformance and potential conflicts.

1.3.2 Cooperating Agencies

The CEQ regulations implementing NEPA encourage the lead federal agency to invite other federal, state, tribal or local agencies with jurisdiction by law or special expertise with respect to environmental issues addressed in the analysis to serve as cooperating agencies in the preparation of the EIS (40 C.F.R. 1508.5 and 1501.6).

Although this EIS is a BLM process and document, the BLM understands there are key considerations that the five Cooperating Agencies must have evaluated in order for each agency to make their own informed decisions on the applicant's proposal. This EIS has been developed to assess the issues identified by each of the Cooperating Agencies and the public. There are numerous issues and concerns associated with the proponent's proposal. As such, the alternatives development and impact assessment (Chapters 2.0 and 4.0, respectively) are focused on those issues and concerns that would help the BLM and Cooperating Agencies to differentiate between alternatives and/or are critical to the decision-making process.

A summary of each Cooperating Agency's mission and general policy guidance, critical interests, and concerns with respect to the proposed Project, and Project review and/or permitting responsibilities is provided below.

1.3.2.1 U.S. Army Joint Base Lewis-McChord Yakima Training Center

The JBLM YTC is a formal Cooperating Agency responsible for processing Pacific Power's application on federal lands managed by the Army. The Army has established procedures to permit third parties to use Army-managed lands for purposes that do not conflict with their mission as a military training area. Furthermore, environmental stewardship and sustainability is an integral part of the Army's mission. Per this commitment, the Army must analyze and minimize impacts to resources that would result from decisions to grant ROWs for third party uses. The Army will use this EIS as the basis from which to make decisions related to granting ROW to Pacific Power for the construction, operation, and maintenance of a new 230 kV transmission line; and to establish the need for any required mitigation of impacts occurring on Army lands.

1.3.2.2 Bonneville Power Administration

BPA is a formal Cooperating Agency because it owns and operates the existing Vantage Substation, to which Pacific Power is proposing to interconnect its proposed transmission line. BPA will need to decide whether to allow this interconnection. Vantage Substation is part of the Federal Columbia River Transmission System (FCRTS) and is owned and operated by BPA, a federal agency that is part of the U.S. Department of Energy (DOE). Under its Open Access Transmission Tariff (OATT), BPA maintains an Interconnection Request Queue to manage requests to interconnect to the FCRTS. BPA offers transmission interconnection to the FCRTS to all eligible customers on a first-come, first-served basis, with this offer subject to an environmental review under NEPA. In 2008, Pacific Power submitted its request to BPA to interconnect the proposed line to BPA's Vantage Substation. BPA will use this EIS as the basis from which to make a decision concerning Pacific Power's request for the proposed interconnection.

1.3.2.3 U.S. Bureau of Reclamation

Reclamation is a formal Cooperating Agency responsible for processing Pacific Power's ROW application (SF 299) filed on April 17, 2011, requesting a grant of ROW across federal lands managed by Reclamation. Reclamation will use this EIS as the basis from which to make decisions relating to granting a ROW to Pacific Power for construction, operation and maintenance of a new 230 kV transmission line and the need for any required mitigation of impacts occurring on Reclamation administered lands.

1.3.2.4 Yakima County

Yakima County is a formal Cooperating Agency because of its responsibility under county code to review the proposed transmission line project which is subject to a Type II Land Use review. The review and associated public hearing is to determine that the development standards are met and compatibility with neighboring uses and consistency with County Code can be met. In order for Yakima County to conduct a Type II Land Use review and make a decision regarding the issuance of a Type II Administrative Permit, it is necessary for the project to comply with the Washington State Environmental Policy Act (SEPA). Yakima County may choose to adopt this EIS to satisfy SEPA requirements.

1.3.2.5 Grant County

Grant County is a formal Cooperating Agency. Grant County has a coordinating ordinance (Chapter 21.04 Coordinating Government Regulation of Land and Natural Resource Use) which establishes as county law the basis and process for determining how federal and state agencies are to coordinate and consult with Grant County in actions affecting land and natural resource use within the county.

A section of the Grant County Unified Development Code (Chapter 25.08) which historically regulated electrical transmission lines exceeding 115 kV as a major utility development and subject to land use and environmental review and a Conditional Use Permit was eliminated through amendment to the county code by the Board of County Commissioners in July 2011.

However, the Grant County Building Code does not exempt private regulated utilities, like Pacific Power from a requirement to obtain a building permit from the county. The building permit is considered a "Project Permit" and as such SEPA review is required (D. Hooper, Personal Communication, July 2011). The building permit is an administrative permit; no Planning and Zoning or Board of County Commissioners approval is required. Grant County may choose to adopt this EIS to satisfy SEPA requirements.

1.4 WASHINGTON STATE ENVIRONMENTAL POLICY ACT

In order for the affected Counties to issue permits for the proposed transmission line, it is necessary for the project to comply with SEPA. Yakima and Grant Counties may choose to be co-lead agencies for the purposes of SEPA compliance and may choose to adopt this NEPA EIS to satisfy SEPA requirements for approvals in their respective counties as allowed by WAC 197-11-610. The Counties will provide additional public notice as required by State and local statutes when completing the SEPA review process.

1.5 PURPOSE AND NEED

1.5.1 Bureau of Land Management Purpose and Need

Pacific Power has submitted a ROW application to construct, operate and maintain a 230 kV transmission line across BLM managed public lands. The BLM action on this proposal would be the issuance of a land use authorization (specifically, a ROW grant) for the proposed non-federal use of public lands.

The purpose of BLM's action is to respond to Pacific Power's application for use of BLM-administered lands for a ROW to construct, operate and maintain a 230 kV transmission line. Specifically, BLM will decide whether to grant, grant with conditions, or deny the application for a new ROW. Pursuant to 43 C.F.R. 2805.10, if BLM issues a grant, the BLM decision maker may include terms, conditions, and stipulations which she or he determines to be in the public interest. This includes modifying the proposed use or changing the route or location of the facilities on public land. The BLM's need for action to respond to Pacific Power's ROW application, arises from the Federal Land Policy and Management Act of 1976 (FLPMA) which establishes a multiple use mandate for management of federal lands, including energy generation and transmission facilities as outlined in 43 C.F.R. 2800.

The FLPMA, as amended, is the BLM's principal authority for land management activities. According to FLPMA Section 102(a)(7) and the definition of multiple use in Section 103(c), public lands are to be managed for multiple use and sustained yield, taking into account the long-term needs of future generations for renewable and non-renewable resources. In Section 102(a)(8), the law further states that public lands are to be managed in a manner that protects the quality of the resources and values present, and to provide food and habitat for fish and wildlife, among other objectives. Section 501(a) (4) of FLMPA authorizes the Secretary of the Interior (i.e., BLM) to grant ROWs on public lands for systems of generation, transmission, and distribution of electric energy. The use of public lands for energy related facilities is also recognized and encouraged by the Energy Policy Act of 2005 (Title II, Section 211) and the President's Energy Policy. Other notable federal laws relevant to the BLM's purpose and need include, but are not limited to, the Endangered Species Act of 1973, as amended, and Section 106 of the National Historic Preservation Act.

Pursuant to 43 C.F.R. § 2801.2, it is BLM's objective to grant ROWs and to control the use of ROWs on public lands in a manner that:

(a) Protects the natural resources associated with public lands and adjacent lands, whether private or administered by a government entity;
(b) Prevents unnecessary or undue degradation to public lands;
(c) Promotes the use of ROWs in common considering engineering and technological compatibility, national security, and land use plans; and
(d) Coordinates, to the fullest extent possible, all BLM actions under the regulations in this part with state and local governments, interested individuals, and appropriate quasi-public entities.

1.5.2 U.S. Army Yakima Training Center Purpose and Need

Pacific Power has submitted a ROW application to construct, operate and maintain a 230 kV transmission line across JBLM YTC administered lands. The JBLM YTC action on this proposal would be to grant the use of Army administered lands.

The JBLM YTC need for action, to respond to Pacific Power's ROW application, arises from Army Regulation 405-80, Management of Title and Granting Use of Real Property, October 1997 and 32 C.F.R. 643. Army Regulation 405-80 identifies the process under which Army controlled real property can be made available for non-Army purposes to private parties (e.g., Pacific Power).

32 C.F.R. 643 sets forth the authority, policy, responsibility and procedure for making military real estate, under the control of the Army, available for use by other military departments, federal agencies, state and local governmental agencies, private organizations, or individuals.

1.5.3 Bonneville Power Administration Purpose and Need

Pacific Power has submitted a request to BPA to interconnect Pacific Power's proposed transmission line to the FCRTS at BPA's existing Vantage Substation. The BPA action would be to grant that interconnection request.

BPA's need for action, to respond to Pacific Power's interconnection request, arises from the procedures and processes for transmission interconnection requests that implement BPA's OATT. BPA will consider the following objectives or purposes in deciding whether to grant the request:

- Maintain the electrical stability and reliability of the FCRTS
- Continue to meet BPA's statutory and contractual obligations
- Act consistently with BPA's environmental and social responsibilities
- Provide for cost and administrative efficiency

1.5.4 U.S. Bureau of Reclamation Purpose and Need

Pacific Power has submitted a ROW application to construct, operate and maintain a 230 kV transmission line across Reclamation managed public lands. The Reclamation action on this proposal would be the issuance of a land use authorization (specifically, a ROW grant) for the proposed non-federal use of public lands.

Reclamation's need for action, to respond to Pacific Power's ROW application, arises from 43 C.F.R. 429, Use of Bureau of Reclamation Land, Facilities, and Waterbodies. These procedures are for use authorizations for such things as ROW requests like that of Pacific Power to cross Reclamation administered land.

1.6 DECISIONS TO BE MADE

This EIS is an informational document for agency decision-makers and the public regarding the environmental effects of the proposed Vantage-Pomona Heights 230 kV Transmission Line and ROW. The specific decisions that will be made by BLM, JBLM YTC, BPA, Reclamation, and the counties are described below.

Separate authorizations would be issued by BLM and the Cooperating Agencies to permit construction, operation and maintenance of the transmission line across lands managed by each respective agency. The BLM and Cooperating Agencies will use the EIS process to issue separate final decisions to approve, modify or deny the authorizations.

Although the BLM is the lead federal agency responsible for the preparation of this EIS, the BLM's decision regarding a land use authorization for the proposed transmission line constitutes only a small portion of the overall project. Numerous other permits, approvals, and/or favorable decisions would be necessary in order to construct an end-to-end route between the Vantage and Pomona Heights substations. Furthermore, if approved, the BLM, Cooperating Agencies, and other agencies with permitting authority would have a goal to reach a consensus on the selected route, components, and stipulations. However, each entity reserves the right to make its own independent decision.

Based on the analysis presented in the BLM's EIS, various agencies, including but not limited to the BLM and formal Cooperating Agencies, will make a decision or determination regarding Pacific Power's proposed Project. The considerations and/or decisions to be evaluated through this EIS process include, but are not limited to:

- Whether to grant Pacific Power a major ROW to construct, operate, and maintain the proposed facilities and, if granted, to specify all applicable terms and conditions.
- If impacts of the proposed Project are determined to result in unacceptable impacts, the proponents' proposed Project may not be authorized in its entirety or a different combination of project elements may be authorized.
- Whether some or all mitigation measures identified in the EIS may be adopted or if additional measures may be required.

1.6.1 Bureau of Land Management

The BLM will decide whether to grant, grant with conditions, or deny Pacific Power's application to construct, operate, and maintain a new 230 kV transmission line on lands managed by the WFO. If the BLM issues a grant, the BLM may include terms, conditions, and stipulations that the BLM determines to be in the public interest (43 C.F.R. 2805.10). This includes modifying the proposed use or changing the route or location of the facilities on public land.

1.6.2 Cooperating Agencies

1.6.2.1 U.S. Army Yakima Training Center

The JBLM YTC will decide whether to grant, grant with conditions, or deny Pacific Power's application to construct, operate and maintain a new 230 kV transmission line on Army controlled real property for non-Army purposes.

1.6.2.2 Bonneville Power Administration

BPA will decide whether to allow the interconnection of the new Vantage to Pomona Heights 230 kV transmission line to BPA's Vantage Substation and the FCRTS.

1.6.2.3 U.S. Bureau of Reclamation

Reclamation will decide whether to grant, grant with conditions, or deny Pacific Power's application to construct, operate and maintain a new 230 kV transmission line on lands managed by Reclamation. If Reclamation issues a grant, they may include terms, conditions and stipulations that are determined to be in the public interest (43 C.F.R. 429).

1.6.2.4 Yakima County

Under Yakima County Code (YCC) Title 15, the proposed Project is subject to a Type II Land Use review. A Type II application shall be reviewed by the Administrative Official and may be conditioned in order to ensure compatibility and compliance with the provisions of the zoning district and the goals, objectives and policies of the Yakima County Comprehensive Plan – *Plan 2015*. For the county to make a decision regarding the issuance of a Type II administrative permit, it is necessary for the project to comply with SEPA.

1.6.2.5 Grant County

The Vantage to Pomona Heights 230 kV Transmission line is subject to Shoreline Substantial Development Permit and Shoreline Conditional Use Permit pursuant to Grant County Shoreline Master Program (SMP). In addition to the SMP requirements, the project is subject to review under SEPA, which will be required to be completed concurrently with the Substantial Development Permit. The structures for this transmission line may also be subject to local building permit requirements.

1.7 LAND USE PLAN CONFORMANCE

The Spokane RMP Record of Decision (ROD) (BLM 1987) is the approved land use plan applicable to BLM lands within the proposed Project area. Federal regulations (43 C.F.R. 1610.5-3(a)) state: "All future resource management authorizations and actions, as well as budget or other action proposals to higher levels in the Bureau of Land Management and Department, and subsequent more detailed or specific planning, shall conform to the approved plan." The RMP ROD contains specific goals and objectives to provide authorizations, including ROWs, for public and private uses while maintaining and improving resource values and public land administration, and the proposed action is in compliance with this plan.

In general, the 1987 ROD allows for a variety of land uses, including ROW grants, provided that those uses can occur within the sustained yield capability of the resource and that appropriate consideration is given to mitigating resource concerns (BLM 1987, p. 12).

The 1987 ROD specifically provides for ROW grants on BLM-managed lands in the following decision:

> All public land will be available and open for utility and transportation corridor development except the Hot Lakes [Research Natural Area and Area of Critical Environmental Concern] RNA/ACEC, the Brewster Bald Eagle Roost and Juniper Forest ACECs, the Chopaka Mountain [Wilderness Study Area] WSA, and the Juniper Dunes Wilderness Area Corridors have been identified and designated on BLM lands in Washington… Corridor widths may vary but are a minimum of 200 feet. Additional corridors will be considered on a case-by-case basis.

Applicants will be encouraged to locate new facilities within existing corridors to the extent possible (BLM 1987, p. 27).

As stated, the 1987 ROD established ROW corridors that generally followed the path of the existing BPA transmission lines that crossed the Saddle Mountains (shown on RMP map #2). Segments of the proposed Vantage-Pomona Heights transmission line alternatives would use a portion of one of these corridors.

1.8 AUTHORIZATIONS, PERMITS, REVIEWS, AND APPROVALS

Various approvals and/or permits would be required from other agencies or jurisdictions to implement one or more of the components of the proposed Project. Table 1-1 lists the major federal, state and local authorizations, permits, reviews and approvals identified for the construction and operation of the proposed Project. Other authorizations, permits, reviews or approvals for construction and operation may be required. Pacific Power would be responsible for obtaining all permits and approvals required to implement the proposed Project.

TABLE 1-1 AUTHORIZATIONS, PERMITS, REVIEWS, AND APPROVALS

ACTION REQUIRING PERMIT, APPROVAL OR REVIEW	PERMIT/APPROVAL/ COMPLIANCE OR REVIEW	ACCEPTING AUTHORITY/ APPROVING AGENCY	STATUTORY REFERENCE
FEDERAL			
Power Line Construction and Operation on BLM	NEPA Compliance EIS and ROD	BLM	NEPA, 42 U.S.C. 4321 40 C.F.R. 1500-1508
Power Line Construction and Operation on JBLM YTC	NEPA Compliance EIS and ROD	JBLM YTC, Army	NEPA, 42 U.S.C. 4321 40 C.F.R. 1500-1508 32 C.F.R. 651
Power Line Construction and Operation on BLM	ROW Grant	BLM	FLPMA 1976 (PL94-579) 43 U.S.C. 1761-1771 and 43 C.F.R. 2800
Power Line Construction and Operation on Reclamation	ROW Grant	Reclamation	43 C.F.R. 429
Request for Interconnection to FCRTS	Grant of Interconnection	BPA	NEPA, 42 U.S.C. 4321 40 C.F.R. 1500-1508
Power Line Construction and Operation on JBLM YTC	Grant of Use of Real Property	JBLM YTC, Army	Army Regulation 405-80 and 32 C.F.R. 643
Construction, operation and abandonment of transmission lines across or within highway ROW	Permit to cross Federal Aid Highway	Federal Highway Administration (FHWA)	Department of Transportation (DOT) Act: U.S.C. 116, 123, 315, 23 C.F.R. 1.23 and 1.27 23 C.F.R. 645, 23 C.F.R. 771
Protection of Cultural Resources	Grant of ROW by BLM and JBLM YTC National Historic Preservation Act Compliance Section 106	BLM and JBLM YTC State Historic Preservation Office (SHPO) and affected Tribes	NHPA of 1966: 36 C.F.R. 800, 16 U.S.C. 47
Protection of Endangered Species	Grant of ROW by BLM or JBLM YTC Endangered Species Act with U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS)	USFWS and NMFS	ESA 1973 Amended: 16 U.S.C. 1531

ACTION REQUIRING PERMIT, APPROVAL OR REVIEW	PERMIT/APPROVAL/ COMPLIANCE OR REVIEW	ACCEPTING AUTHORITY/ APPROVING AGENCY	STATUTORY REFERENCE
Protection of Migratory Birds	Compliance	USFWS	MBTA 1918: 16 U.S.C. 703-712, 50 C.F.R. 1
Protection of Bald and Golden Eagles	Compliance	USFWS	Bald and Golden Eagle Protection Act 1972: 16 U.S.C. 668
Protection of Special Status Species	Compliance	BLM and JBLM YTC	BLM Policy Manual 6840 and Army Regulation 200-1
Construction Sites with greater than one acre of land disturbed	Section 402 NPDES, General Permit for Storm Water Discharge from Construction Activities and Storm Water Pollution Prevention Plan (SWPPP)	U.S. Environmental Protection Agency (EPA)	Clean Water Act (CWA) 33 U.S.C. 1251 et seq. 40 C.F.R. 122,123
Crossing 100-year floodplain, streams, or rivers	Floodplain Use Permit	U.S. Army Corps of Engineers (USACE)	40 U.S.C. 961
Construction in or modifications of floodplains	Compliance	Lead Agency	42 U.S.C. 4321 EO 11988 Floodplains
Construction in or modifications of wetlands	Compliance	Lead Agency	42 U.S.C. 4321 EO 11990 Wetlands
Work in, over, or under Navigable Waters of the U.S. (Columbia River Crossing)	Section 10 Permit Joint Aquatic Resources Permit (JARPA)	USACE	Rivers and Harbors Act 1899 33 U.S.C. 322
Potential discharge into waters of the U.S.	Section 401 Permit JARPA	USACE	CWA Section 401 33 U.S.C.1344 40 C.F.R. 961
Discharge of dredge or fill material to a watercourse	Section 404 Nationwide Permit JARPA	USACE	CWA Section 404 33 U.S.C. 1344 40 C.F.R. 230
Tower location and height relative to air traffic corridors	Form 7460-1 Notice of Proposed Construction or Alteration	FAA (Federal Aviation Administration)	49 U.S.C. 1501 Objects Affecting Navigable Airspace 13 C.F.R. 77
STATE			
Power Line Construction and Operations on State lands	Easement	WA Dept of Natural Resources (WDNR)	RCW 79.36.510, WAC 197-11
SEPA Compliance on State lands	EIS	WDNR	WAC 173-802, 197-11
Potential discharge into waters of the U.S.	401 Permit, Joint Aquatic Resource Permits Application (JARPA)	WDNR, WA Dept of Ecology (WDOE), WA Dept of Fish and Wildlife (WDFW)	WAC173-158
Discharge of dredge or fill material to a watercourse	404 Permit, JARPA	WDNR, WDOE, WDFW	WAC 173-700
Power Line Construction and Operations on State roads	Utility Crossing Permit	WA State Dept of Transportation (WSDOT)	WAC 468-34 Utility Accommodation Policy M 22-86.01
Power Line Construction and Operations on State lands	State Historic Preservation Compliance	WA Dept of Archeology and Historic Preservation (WDAHP)	RCW 27.34, 44, 53, WAC 25-12, 19, 46, 48

ACTION REQUIRING PERMIT, APPROVAL OR REVIEW	PERMIT/APPROVAL/ COMPLIANCE OR REVIEW	ACCEPTING AUTHORITY/ APPROVING AGENCY	STATUTORY REFERENCE
COUNTY			
Power Line Construction and Operation within or on private property	Administrative Type II Permit and SEPA Compliance	Yakima County Board of County Commissioners	YCO 15.18, 16.04
Power Line Construction and Operation within or on private property	Building Permit and SEPA Compliance	Grant County Building Department	GCO 23.04.040CC
Power Line Construction and Operation within or on private property or use of County Road ROW	Transmission Line is Permitted Use, County Franchise Agreement for County Road ROW	Kittitas County Board of County Commissioners	KCC 12.56, RCW 36.55
Power Line Construction and Operation within or on private property or use of County Road ROW	Shoreline Permit for Substantial Development	Benton County Shoreline Hearing Board	BCC Title 17 Permit Review Process. Chapter 17.10
Power Line Construction and Operation within or on private property or use of County Road ROW	Building Permit	Benton County Building Department	BCC Title 3, Chapter 3.04
Provide control of airborne dust particles during construction	Dust Control Plan	Yakima Regional Clean Air Agency	Construction Dust Control Policy
Provide control of noxious weeds during construction and operation	Noxious Weed Management Plan	County Weed Control Districts (all that apply)	RCW 17.10, WAC 16-750 Noxious Weed List

1.9 SCOPING AND PUBLIC INVOLVEMENT

Public participation is essential for the environmental review process and informed decision making. Scoping occurs early in the NEPA process and generally extends through development of alternatives.

The intent of scoping is to determine the scope of issues to be addressed in the EIS and identify the significant issues related to the proposed Project by soliciting comments from interested and potentially affected parties, including landowners, citizens, tribes, government agencies and interest groups and organizations (40 C.F.R. 1501.7). Scoping activities conducted by the BLM and JBLM YTC as required by 40 C.F.R. 1501.7 are described below.

The Notice of Intent (NOI) to prepare an EIS for the Vantage-Pomona heights 230 kV Transmission Line Project was published in the *Federal Register* on January 5, 2010. The NOI included a detailed description of the proposed Project, purpose of public scoping, the role of BLM and other cooperating agencies, a list of preliminary environmental issues, notification of planned public meetings, and procedures for submitting comments on the proposed Project and issues of concern. Publication of the NOI also marked the beginning of a 60-day public comment period, January 5 through March 8, 2010.

In addition to the *Federal Register* notice, the BLM and JBLM YTC sent letters to private landowners located within 0.25 mile of either side of the assumed centerlines of the preliminary alternative routes notifying them of the BLM and JBLM YTC's intent to prepare an EIS; the dates, time, and locations of the public scoping meetings; and comment period deadlines.

Scoping letters were also sent to interested agencies, individuals, groups, and organizations on the BLM and YTC's mailing lists. Additionally, scoping letters were sent to federal, state, and local agencies and elected officials notifying them of the project and the scoping period and inviting them to attend an agency scoping meeting. A total of 1,280 public and agency notification letters were sent on January 14, 2010.

Other scoping notifications included a BLM news release to local media outlets and the development of a project webpage on the BLM Spokane District website: http://www.blm.gov/or/districts/spokane/plans/vph230.php.

The BLM and JBLM YTC held two open house format public scoping meetings to explain the project and receive input on environmental concerns. Meetings were held on the following dates at the locations listed below:

- February 3, 2010 at the Selah Civic Center, Selah, Washington (approximately 70 participants).
- February 4, 2010 at the Mattawa Elementary School Cafeteria, Mattawa, Washington (approximately 25 participants).

An initial agency scoping meeting was held on February 3, 2010, in Selah.

During the initial scoping period, three main alternative routes, including numerous sub-routes, were presented for public and agency review and comment:

1) A northern route crossing JBLM YTC roughly parallel with the existing Pacific Power Pomona-Wanapum transmission line;
2) A route that mostly crossed JBLM YTC land just inside the southern boundary; and
3) A route mostly on private land, approximately one-half mile south of the JBLM YTC boundary.

During the open houses the public and other agencies were given the opportunity to learn about the proposed action, regulatory processes and project details with the BLM, JBLM YTC, Project consultants and proponent representatives and provide comments.

Comments were received through a variety of methods: email, comment forms collected at the scoping meetings, comments submitted at GIS workstations, comments submitted by mail or fax and written and verbal comments recorded by BLM, JBLM YTC and consultant staff at the scoping meetings. All comments were analyzed and assisted in defining the issues to be analyzed in the EIS. A detailed description of the scoping process and summary and analysis of the comments received from the public and agencies during the scoping period is presented in the *Vantage Pomona Heights 230 kV Transmission Line Project EIS Scoping Summary Report* (BLM 2010). A more detailed description of the public involvement efforts is presented in Chapter 5 Consultation and Coordination.

In response to public and agency input received during the scoping period, as well as a military aviation safety issues identified after scoping, it was necessary to eliminate certain route alternatives and to make major adjustments to the remaining alternatives. The route alternatives eliminated from consideration are discussed in Chapter 2.0, Section 2.6.4 Route Alternatives Considered and Eliminated.

Subsequently, on its own initiative Pacific Power met with elected officials, planning authorities, and landowners in Yakima, Grant, and Kittitas counties, and the JBLM YTC in an effort to identify new feasible route options. Pacific Power then held its own open house meetings in Yakima and Mattawa on September 8 and 9, 2010, respectively, to present the newly proposed routes and obtain input from the public and agencies. After the meetings, Pacific Power further discussed its proposed new routes with the BLM and JBLM YTC and later submitted amended ROW applications to both agencies.

A second scoping letter was distributed to interested individuals, groups, organizations, and agencies on January 14, 2011. The second letter was intended to provide interested parties with an update on the project status and changes, including new route alternatives that were developed as a result of the early initial scoping period. The second letter was distributed to approximately 1,100 parties and requested that comments be submitted by February 4, 2011.

A second agency scoping meeting was held on March 1, 2011 in Ellensburg. The meeting brought together representatives and resource specialists from the BLM, JBLM YTC, USFWS, Reclamation, Pacific Power, Yakama Nation, WDFW, WDNR, WSDOT, Grant County , Kittitas County and the third-party contractor (POWER). During the meeting the attendees discussed issues associated with the new route alternatives, the EIS document outline and preparation schedule, data needs, analysis methods and protocols and schedules for biological and other resource inventories.

1.10 ISSUES IDENTIFIED

This section briefly describes the issues identified for further analysis in this EIS. The following discussion incorporates issues raised during public scoping, as well as internal BLM and Cooperating Agency scoping.

1.10.1 Issues Identified for Further Analysis

The following issues have been identified for further analysis in this EIS. In many cases, these issues were considered in the development of project alternatives (described in Chapter 2.0). In all cases, these issues will be further described and analyzed in Chapters 3, 4, and 5. The issues presented in Table 1-2 are not intended as a comprehensive list of all issues to be evaluated in the EIS; these issues represent the key concerns of the public, project team staff, and cooperators. A detailed summary of issues identified is contained in the Scoping Summary Report.

TABLE 1-2 ISSUES RAISED BY THE PUBLIC AND GOVERNMENT AGENCIES

BIOLOGICAL RESOURCES
How would the proposed Project affect sage-grouse populations and habitat?
What would the effects of the proposed Project construction and operation be on special status wildlife species and birds protected under the Migratory Bird Treaty Act?
What would be the potential for avian collision during operation?
What would be the effect on vegetation from construction and maintenance of the proposed Project?
How much disturbance would occur in sagebrush and native grassland communities and what would be the effects?
What would be the effects to endangered and threatened plant species?
Would noxious weeds be introduced or spread into the ROW and how would they be controlled?
Would there be effects on permanent and seasonal wetlands and riparian areas?
CONFLICT WITH OTHER UTILITY LINES
Would the proposed Project conflict with other existing utility lines and electrical infrastructure (Grant County PUD and BPA lines) and what engineering and system studies would be required to avoid impact or conflict?
CULTURAL RESOURCES
What would the potential impacts be on cultural resources, including prehistoric and historic sites?

HUMAN HEALTH AND SAFETY
What would be the impact to aerial spraying and the use of helicopters to dry cherry orchards?
Would there be a potential safety hazard from static electricity (induced current) from farm workers using or maintain irrigation equipment under a transmission line?
Would services such as global positioning system receivers, satellite dish receivers, cell phones, AM/FM radio, two way radio communication, television and Internet be disrupted?
Would electric and magnetic fields associated with transmission lines cause health effects?
LAND USE AND RECREATION
How would the proposed Project affect current agricultural systems, including center-pivot irrigation and advanced positioning systems and other electronics used in modern farm equipment?
What residential areas and planned development would be affected?
Would highly productive or revenue generating state lands be affected?
How much agricultural land would be impacted and what would the effects be?
What would be the impact to agricultural production, including equipment operation and aerial spraying?
Would there be any affect on recreational areas and opportunities?
NATIVE AMERICAN CONCERNS
Cultural properties in the vicinity of some of the alternative routes are of concern to several Native American Tribes.
SOCIOECONOMICS
What would be the potential financial impacts to farming and agricultural operations from loss of farmable land, orchards, vineyards, and relocation of wheel line and center pivot irrigation systems and other agricultural infrastructure?
What would be the effect on property values?
Would there be effects on low-income and minority populations or communities?
TRAFFIC AND TRANSPORTATION
What is the potential for increased public access on access roads?
VISUAL RESOURCES
Would the proposed Project impact aesthetics and scenic views of private property owners and if so how much?
Do the visual effects on BLM land conform to Visual Resource Management objectives established in BLM resource management plan?
WILDLAND FIRE RISK
How would the transmission line affect fire management activities?
Would the proposed Project increase the risk of wild fire?
Could fire in the sage steppe impact the operation of the transmission line?
Would the proposed transmission line affect the aerial wildland fire suppression capability of JBLM YTC?
YAKIMA TRAINING CENTER OPERATIONS
Would the proposed Project impact JBLM YTC training operations?

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CHAPTER 2 PROPOSED ACTION AND ALTERNATIVES

This chapter describes the proposed Project, the alternatives analyzed in detail and those alternatives that were considered but eliminated from further consideration. The following discussion pertains to activities and features that are common to the action alternatives (involving construction of the Project). The No Action Alternative is also described.

2.1 PROJECT OVERVIEW

2.1.1 New 230 kV Transmission Line

Pacific Power proposes to construct, operate and maintain the new Vantage-Pomona Heights 230 kilovolt (kV) Transmission Line from its existing Pomona Heights substation east of Selah in Yakima County, Washington to the existing Bonneville Power Administration (BPA) Vantage substation east of the Wanapum Dam in Grant County, Washington. The route alternatives considered in this Environmental Impact Statement (EIS) range from 61.0 to 66.7 miles in length. To present the analysis results clearly, route alternatives are evaluated within each of three analysis zones (Figure 2-1). See Section 2.7 for a summary comparison of alternatives.

As proposed by Pacific Power, most of the proposed transmission line would be constructed on H-frame wood pole structures between 65 and 90 feet tall and spaced approximately 650 to 1,000 feet apart depending on terrain. The H-frame structures would typically be used in open flat to gently rolling terrain. In developed or agricultural areas, single wood or steel monopole structures would be used. The single pole structures would be between 70 and 110 feet tall and spaced approximately 400 to 700 feet apart. The right-of-way (ROW) width for the H-frame structure type would be between 125 to 150 feet and for the single pole structure type between 75 to 100 feet. Dead-end or angle structures will require additional ROW to accommodate guy wires and anchors. For the Columbia River crossing either near BPA's existing Midway substation or below the Wanapum Dam, steel lattice structures approximately 200 feet tall would be used to safely span the up to 2,800 foot crossing. Illustrations of the structure types and typical design characteristics are presented in Section 2.4.1. Final design characteristics would be determined in the detailed design phase of the Project.

Construction of the transmission line would require vehicle, truck, and crane access to each new structure site for construction crews, materials and equipment. Access along the transmission line ROW would include existing roads in their current condition, existing roads that would be improved as part of this Project and new access roads. The Project would use existing roads and trails wherever feasible to minimize the construction of new access roads. In the event that terrain could not be traversed, permanent new roads would be graded to a total width of between 14 and 24 feet (including both the travel surface and shoulders) depending on location and terrain.

During construction of the transmission line, there would be temporary work areas at each structure site to facilitate the safe operation of equipment and construction operations. There would also be temporary work areas at pulling and tensioning sites, material staging sites, and turn-around areas.

Work areas would require a temporary disturbance area of 150 feet by 125 feet (18,750 square feet) for H-frame structures and 150 feet by 80 feet (12,000 square feet) for single pole structures.

Pulling and tension sites for stringing the conductor would require a temporary disturbance area of 125 feet by 400 feet (50, 000 square feet). Sites for pulling and tensioning would be located approximately every 11,000 feet or less.

Turn-around areas may be required in certain areas where construction travel would be restricted by rock outcrops, washes, ravines or sensitive areas. Turn-around areas would typically require a temporary disturbance area of 60 feet by 60 feet or 3,600 square feet.

Several material staging areas, roughly five acres each, would be required for material and equipment storage and for staging construction activities. For this EIS, it is assumed that sites for material staging areas would be located on existing disturbed areas. However, material staging areas would be determined during detail design and may include undisturbed areas, but preference would be given to currently disturbed sites.

2.1.2 Pomona Heights Substation Upgrades

The new 230 kV transmission line would enter Pacific Power's Pomona Heights substation on the northwest edge of the substation. All new equipment would be installed within the existing substation fence. A new steel H-frame terminal structure would be required. New line breakers, new switches, various bus connections and other minor equipment and wiring would be installed to incorporate the new line into the interconnected regional electric transmission grid.

2.1.3 Vantage Substation Upgrades

The Vantage substation is owned by the BPA. A currently occupied bay will be vacated within the substation for termination of the new 230 kV transmission line. The new line would enter the east area of the substation. BPA would design and install the new equipment to interconnect the new 230 kV transmission line to the regional electric transmission grid. All new equipment would be installed within the existing Vantage substation fence.

2.2 DESCRIPTION OF ANALYSIS ZONES AND ROUTE SEGMENTS

Route segments are organized into three analysis zones (Figure 2-1). The following sections describe the analysis zones and the route segments within them.

2.2.1 Zone 1 - West (Route Segments 1a, 1b, 1c)

This zone includes an area from the Pomona Heights Substation to east of Mieras Road and includes Route Segments 1a, 1b, and 1c.

Alternative Route Segment 1a (Agency Preferred Alternative) would begin at the existing Pacific Power Pomona-Heights substation and would extend 2.2 miles eastward along Sage Trail Road following an existing Pacific Power distribution line to the Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) property boundary. This route segment would cross the existing Pacific Power Pomona-Wanapum 230 kV Transmission Line.

Alternative Route Segment 1b (Agency Preferred Alternative) would be located just within the JBLM YTC boundary and would parallel an existing fire break road. This route segment would proceed east from Sage Trail Road for 5.1 miles before turning south for 4.3 miles. The route segment proceeds on a diagonal to the southeast for 1.7 miles before turning east for 1.4 miles. The total distance of Route Segment 1b would be 12.5 miles.
Alternative Route Segment 1c would parallel the western and southern boundary of JBLM YTC on private land. This route segment would proceed east from Sage Trail Road just outside the JBLM YTC boundary for 5.1 miles before turning south along the JBLM YTC boundary for 4.7 miles to the vicinity of Mieras Road. The route segment then would diagonal for 0.4 mile before turning east for 2.8 miles along Mieras Road south of the JBLM YTC boundary for a total distance of 12.9 miles.

2.2.2 Zone 2 - South (Route Segments 2a, 2b, 2c, 2d)

This zone includes an area south of the JBLM YTC boundary roughly to State Highway 24 and extends east to the Columbia River and includes Alternative Route Segments 2a, 2b, 2c, and 2d.

Alternative Route Segment 2a (Agency Preferred Alternative) would extend south of the 1a-1b-2a route node on private property paralleling the boundary of a Washington Department of Natural Resources (WDNR) parcel for a distance of one mile.

Alternative Route Segment 2b would extend east from the 2a-2b-2c route node on private property for four miles to the intersection of a U.S. Bureau of Land Management (BLM) parcel. The BLM parcel would be crossed with an aerial crossing of 970 feet. No structures would be located on the BLM parcel. The route segment would then proceed east on private property along the southern boundary of JBLM YTC for another 12.1 miles. The total distance of route Segment 2b would be 16.4 miles.

Alternative Route Segment 2c (Agency Preferred Alternative) would extend southeast from the 2a-2b-2c route node for 8.6 miles on private property to the intersection of the existing PacifiCorp, Union Gap-Midway 230 kV Transmission Line and the BPA Midway-Moxee 115 kV Transmission Line. The route segment would cross to the south side of the Midway-Moxee 115 kV Transmission Line and would proceed parallel to this existing line for 8.6 miles before crossing to the north of the existing transmission lines for a distance of one mile. The total distance of route Segment 2c would be 18.1 miles.

Alternative Route Segment 2d (Agency Preferred Alternative) would extend from the 2b-2c-2d route node east one mile on private land to the intersection of a BLM parcel. The route segment would then proceed one mile on the BLM parcel. After crossing the BLM parcel, the route segment would proceed in a northeasterly direction for five miles on private land crossing Yakima Ridge, Cold Creek and Umtanum Ridge, intersecting the old abandoned Chicago, Milwaukee, St. Paul, and Pacific (C, M, SP, & P) railroad ROW at the west bank of the Columbia River. The total distance of route Segment 2d would be seven miles.

2.2.3 Zone 3 - East (Route Segments 3a, 3b, 3c)

This zone includes the old C, M, SP, & P railroad ROW west of the Columbia River which is in private ownership and a large area east of the Columbia River in Grant County that includes N Road, the Saddle Mountains, and the Vantage substation. This zone includes route Segments 3a, 3b, and 3c.

Alternative Route Segment 3a (Agency Preferred Alternative) is a short segment (0.1 mile) that facilitates the interconnection of the transmission line into the Vantage substation extending west from the 3a-3b-3c route node.

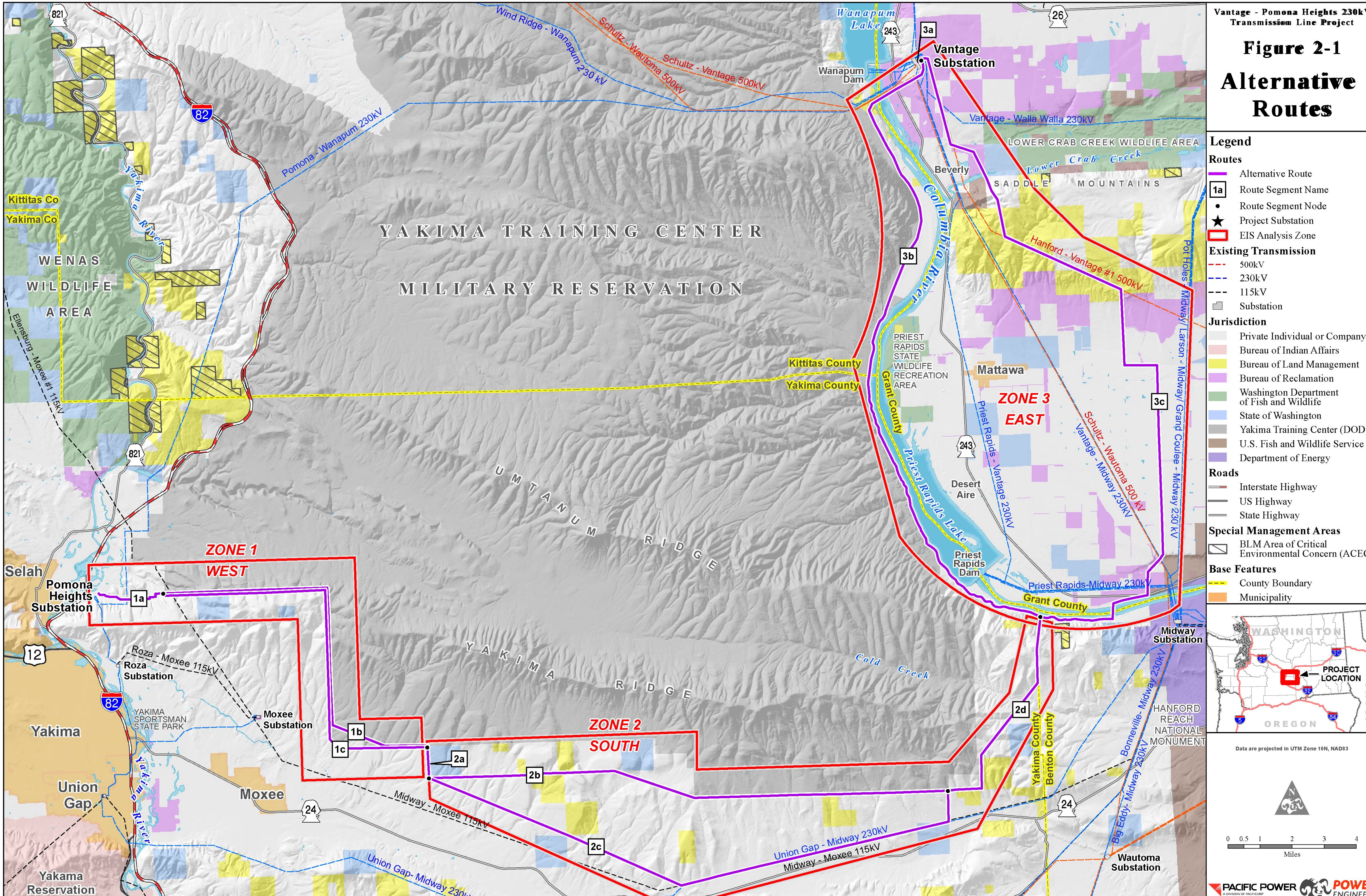
Alternative Route Segment 3b would proceed in a northwest and then northeast direction within the abandoned C, M, SP, & P railroad ROW located on the west bank of the Columbia River and parallel with the JBLM YTC eastern boundary. This route segment would extend 19.3 miles to the Columbia River crossing site north of Auvil Fruit Company land. The Columbia River crossing would proceed east for 0.7 mile (2,965 feet) crossing Huntzinger Road, the Columbia River, with the eastern transmission line structure located on Bureau of Reclamation (Reclamation) land. The route segment would then proceed north and then east for 1.7 miles crossing the Grant County Public Utility District (PUD) Priest Rapids-Vantage 230 kV transmission line and the BPA Vantage-Midway 230 kV line before intersecting with route Segment 3a into the Vantage substation. The total distance of route Segment 3b would be 21.7 miles.

Alternative Route Segment 3c (Agency Preferred Alternative) would proceed east from the 2d-3b-3c route node for 2.4 miles along the abandoned C, M, SP, & P railroad ROW to the Columbia River crossing location east of private agricultural land. The route segment would cross from the south side to the north side of the Columbia River for a distance of 0.4 mile. The route segment would proceed to the northeast, paralleling the Columbia River on private for land 1.2 miles. From that point the route segment would turn north and northeast across Reclamation and private land for 1.4 miles crossing three Grant County PUD Priest Rapids-Midway 230 kV transmission lines, the BPA Vantage-Midway 230 kV transmission line, and the Schultz-Wautoma 500 kV line before intersecting with Road N. The route segment would proceed north on Road N for 3.0 miles crossing Road 27 SW. From Road 27 SW the route segment would continue north, parallel to a Reclamation irrigation canal through agricultural lands for 3.0 miles to the intersection of Road 24 SW. The route segment would then proceed west 0.4 mile parallel to an irrigation canal to avoid agricultural produce storage buildings and then proceed 0.6 mile west to O Road SW before turning north. It would proceed 1.2 miles north to a canal crossing. The route segment would then cross 0.8 mile of Reclamation land to the edge of the BLM land in the Saddle Mountains. The route segment would then cross to the north side of the BPA Hanford-Vantage 500 kV transmission line and would proceed northwest and parallel to the BPA transmission line for 5.3 miles on BLM and private land through the Saddle Mountains. After leaving BLM lands, 1.1 miles of private land would be crossed before crossing Lower Crab Creek near the proposed Burkett Lake Recreation Area and onto Reclamation land. The route would remain on Reclamation land for 1.6 miles and then cross to the west side of the BPA Hanford-Vantage 500 kV line. The route segment would proceed north crossing the PacifiCorp Vantage-Walla Walla 230 kV transmission line, on private and Reclamation land for three miles to the entrance to the Vantage substation. The total distance of route Segment 3c would be 25.4 miles.

Table 2-1 presents a summary of the lengths of the route segments.

TABLE 2-1 ROUTE SEGMENT LENGTHS

ROUTE SEGMENT	LENGTH (MILES)
1a	2.2
1b	12.5
1c	12.9
2a	1.0
2b	16.4
2c	18.1
2d	7.0
3a	0.1
3b	21.7
3c	25.4


Vantage - Pomona Heights 230kV Transmission Line Project
Figure 2-1
Alternative Routes
Legend
Routes
Alternative Route
Route Segment Name
Route Segment Node
Project Substation
EIS Analysis Zone
Existing Transmission
500kV
230kV
115kV
Substation
Jurisdiction
Private Individual or Company
Bureau of Indian Affairs
Bureau of Land Management
Bureau of Reclamation
Washington Department of Fish and Wildlife
State of Washington
Yakima Training Center (DOD)
U.S. Fish and Wildlife Service
Department of Energy
Roads
Interstate Highway
US Highway
State Highway
Special Management Areas
BLM Area of Critical Environmental Concern (ACEC)
Base Features
County Boundary
Municipality
WASHINGTON
OREGON
IDAHO
PROJECT LOCATION
Data are projected in UTM Zone 10N, NAD83
0 0.5 1 2 3 4
Miles
PACIFIC POWER
A DIVISION OF PACIFICORP
POWER ENGINEERS
YAKIMA TRAINING CENTER
MILITARY RESERVATION
UMTANUM RIDGE
YAKIMA RIDGE
SADDLE MOUNTAINS
LOWER CRAB CREEK WILDLIFE AREA
Lower Crab Creek
WENAS WILDLIFE AREA
PRIEST RAPIDS STATE WILDLIFE RECREATION AREA
HANFORD REACH NATIONAL MONUMENT
ZONE 1 WEST
ZONE 2 SOUTH
ZONE 3 EAST
1a
1b
1c
2a
2b
2c
2d
3a
3b
3c
Vantage Substation
Pomona Heights Substation
Roza Substation
Moxee Substation
Midway Substation
Wautoma Substation
Wanapum Lake
Wanapum Dam
Priest Rapids Dam
Priest Rapids Lake
Columbia River
Yakima River
Cold Creek
Kittitas Co
Yakima Co
Kittitas County
Yakima County
Grant County
Benton County
Selah
Yakima
Union Gap
Moxee
Yakama Reservation
YAKIMA SPORTSMAN STATE PARK
Beverly
Mattawa
Desert Aire
Wind Ridge - Wanapum 230 kV
Schultz - Wautoma 500kV
Schultz - Vantage 500kV
Pomona - Wanapum 230kV
Vantage - Walla Walla 230kV
Hanford - Vantage #1 500kV
Pot Holes
Midway Larson - Midway Grand Coulee - Midway 230 kV
Priest Rapids - Vantage 230kV
Vantage - Midway 230kV
Schultz - Wautoma 500 kV
Priest Rapids-Midway 230kV
Ellensburg - Moxee #1 115kV
Roza - Moxee 115kV
Midway - Moxee 115kV
Union Gap - Midway 230kV
Midway - Moxee 115kV
Union Gap - Midway 230kV
Bonneville - Midway 230kV
Big Eddy - Midway 230kV
821
82
12
24
26
243
90
84
5

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2.3 ALTERNATIVES

2.3.1 No Action

If no action is taken, the major federal land ROWs for the Vantage-Pomona Heights 230 kV Transmission Line Project (Project) would not be granted and the Project would not be constructed.

The proponent would not be able to address the reliability issues identified in the Northwest Power Pool (NWPP), Northwest Transmission Assessment Committee (NTAC) Mid-Columbia Transmission Study, namely if an outage of the existing Pomona-Wanapum 230 kV transmission line were to occur it could result in overloading of the adjacent transmission systems and a risk of failure of the regional transmission system. The proponent would not be compliant with Western Electric Coordinating Council (WECC) and Federal Energy Regulatory Commission (FERC) standards.

2.3.2 Route Alternatives

The transmission line route alternatives consist of the interconnection of route segments to form entire end to end alternative routes. The route segment locations are shown on Figure 2-1. There are eight possible end to end route alternatives. The alternative are designated A through H. Table 2-2 presents a comparison of the eight alternatives for a number of metrics consisting of:

- Total Length
- Miles of Jurisdiction/Ownership Crossed
- Miles within each County
- Number of Parcels Crossed
- Number of Private Land Owners
- Miles of Agricultural Land Potentially Affected
- Miles of Existing PacifiCorp Existing Distribution Rights
- Miles Paralleling Existing Transmission Lines

Figure 2-2 provides a schematic illustration of the eight possible end to end route alternatives.

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TABLE 2-2 ALTERNATIVE ROUTE COMPARISON SUMMARY

ROUTES	ALT. A	ALT. B	ALT. C	ALT. D (AGENCY PREFERRED ALTERNATIVE)	ALT. E	ALT. F	ALT. G	ALT. H
Route Segments	**1a, 1b, 2a, 2b, 2d, 3a, 3c**	**1a, 1b, 2a, 2b, 2d, 3a, 3b**	**1a, 1b, 2a, 2c, 2d, 3a, 3b**	**1a, 1b, 2a, 2c, 2d, 3a, 3c**	**1a, 1c, 2a, 2b, 2d, 3a, 3b**	**1a, 1c, 2a, 2b, 2d, 3a, 3c**	**1a, 1c, 2a, 2c, 2d, 3a, 3b**	**1a, 1c, 2a, 2c, 2d, 3a, 3c**
Total Length (miles)	**64.5**	**61.0**	**62.8**	**66.3**	**61.4**	**64.9**	**63.2**	**66.7**
Ownership (miles crossed)								
Bureau of Land Management	6.1	2.1	1.5	5.4	2.1	6.1	1.5	5.4
U.S. Fish & Wildlife Service	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yakima Training Center	12.5	15.5	15.5	12.5	3.0	0.0	3.0	0.0
Bureau of Reclamation	5.4	1.7	1.7	5.4	1.7	5.4	1.7	5.4
Total Federal Land	**24.0**	**19.3**	**18.6**	**23.3**	**6.8**	**11.5**	**6.1**	**10.8**
State Land	0.0	0.0	1.0	1.0	1.0	1.0	2.0	2.0
Grant County Public Utility District	0.0	1.4	1.4	0.0	1.4	0.0	1.4	0.0
Private Land	40.1	39.9	41.4	41.6	51.8	52.0	53.3	53.5
Water	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
County (miles within county)								
Yakima	38.6	1.0	50.5	40.3	49.1	39.0	50.9	40.7
Kittitas	0.0	9.5	9.5	0.0	9.5	0.0	9.5	0.0
Benton	3.1	0.7	0.7	3.1	0.7	3.1	0.7	3.1
Grant	22.8	2.2	2.2	22.8	2.2	22.8	2.2	22.8
Parcels and Landowners								
Number of Parcels Crossed	139	115	136	160	186	210	192	231
Number of Private Landowners	45	23	23	46	68	90	68	90
Miles of Agricultural Land Potentially Affected	2.7	0.0	1.5	4.2	0.2	2.9	1.7	4.4
Miles of PacifiCorp Existing Distribution Rights	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Miles of Paralleling Existing Transmission	6.7	2.2	10.8	15.3	2.2	6.7	10.8	15.3

Notes: Alt. = Alternative

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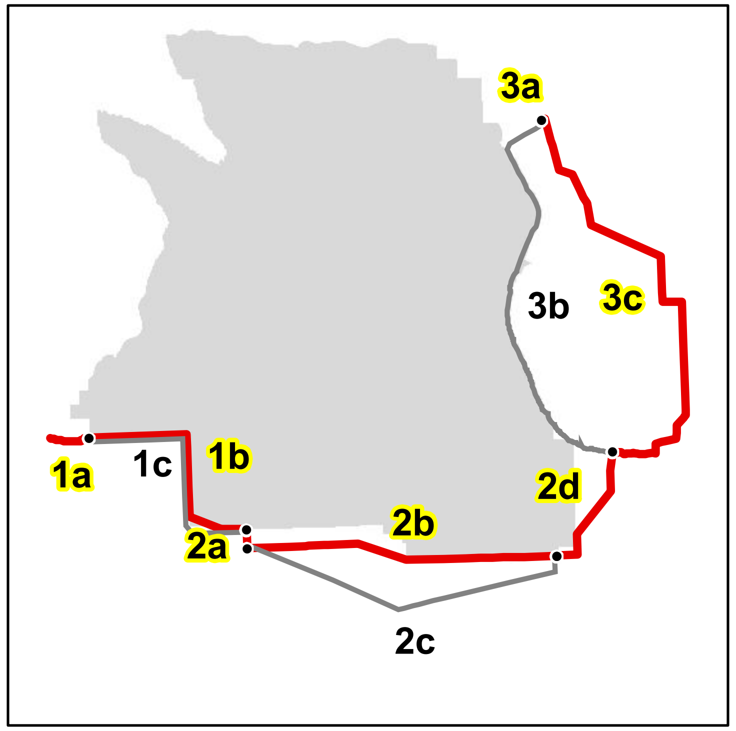
Vantage - Pomona Heights 230kV Transmission Line Project

Figure 2-2
Schematic Illustration of Route Alternatives

Alternative	Link Combination
A	1a, 1b, 2a, 2b, 2d, 3a, 3c
B	1a, 1b, 2a, 2b, 2d, 3a, 3b
C	1a, 1b, 2a, 2c, 2d, 3a, 3b
D	1a, 1b, 2a, 2c, 2d, 3a, 3c

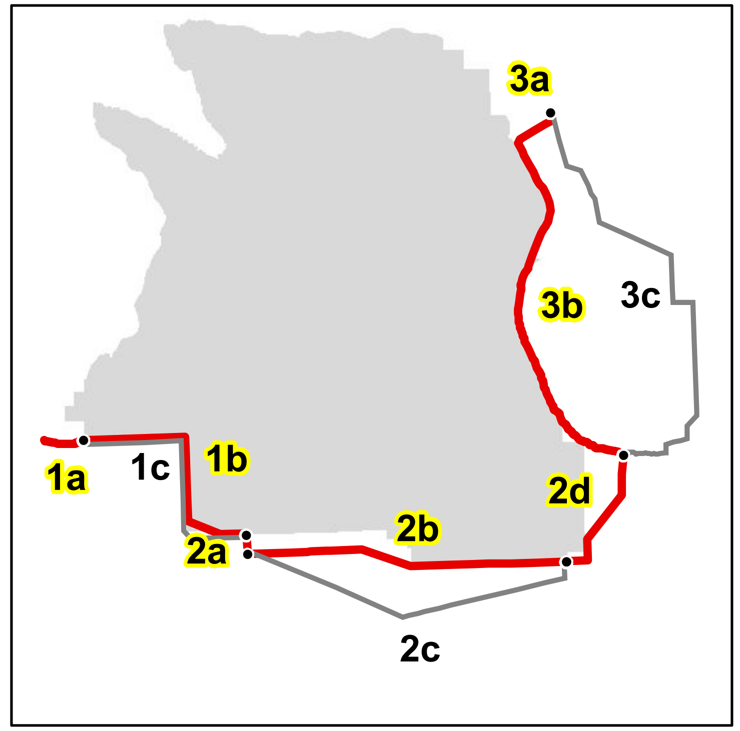
Alternative	Link Combination
E	1a, 1c, 2a, 2b, 2d, 3a, 3b
F	1a, 1c, 2a, 2b, 2d, 3a, 3c
G	1a, 1c, 2a, 2c, 2d, 3a, 3b
H	1a, 1c, 2a, 2c, 2d, 3a, 3c

Alternative A



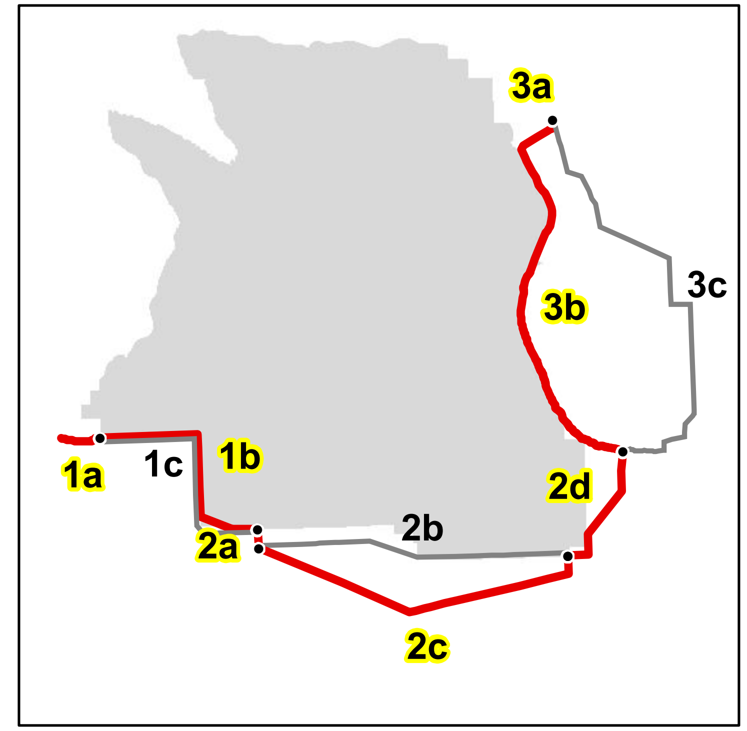
Total Length: 64.5 miles

Alternative B



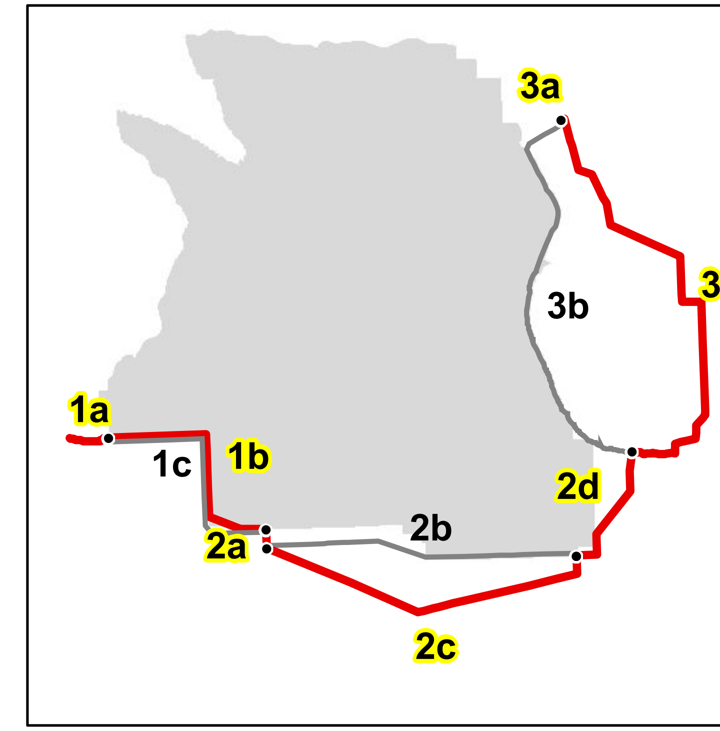
Total Length: 61.0 miles

Alternative C



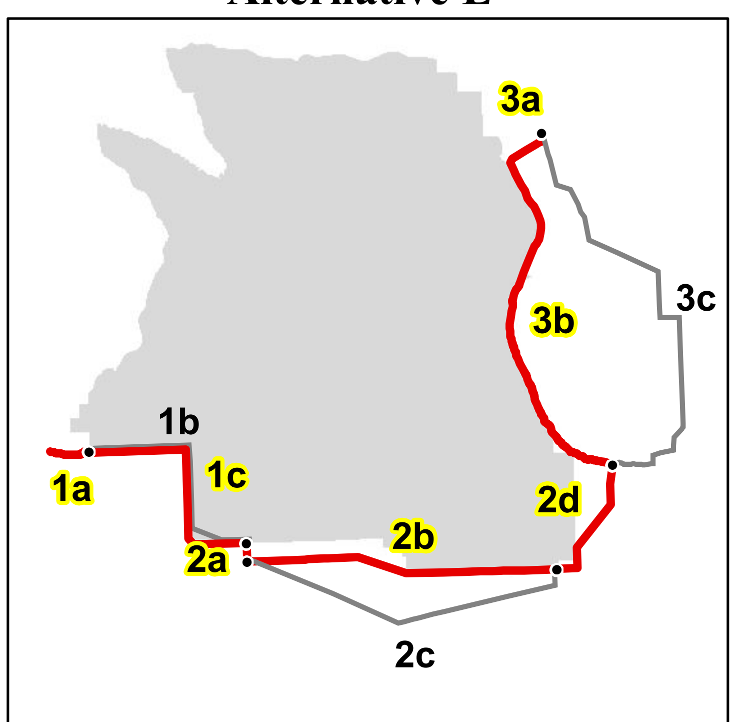
Total Length: 62.8 miles

Alternative D



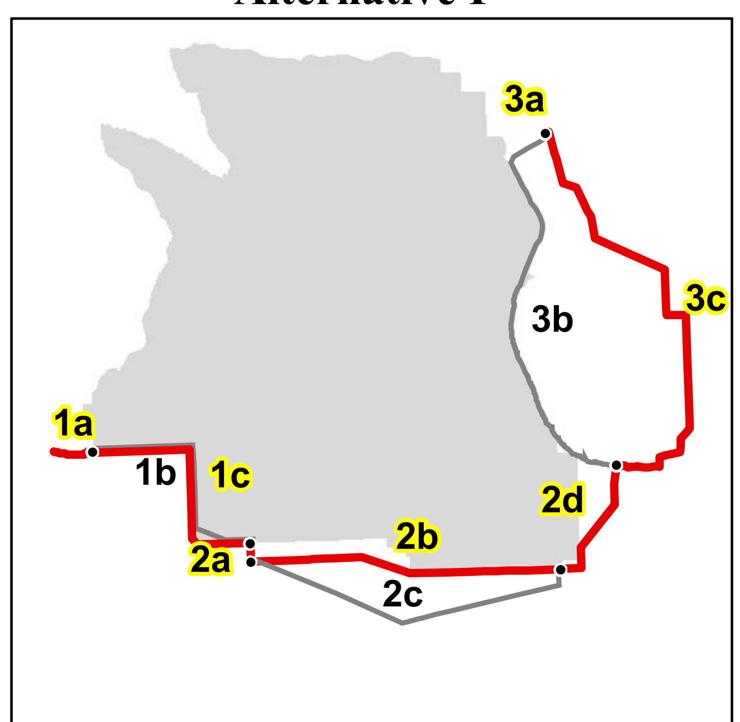
Total Length: 66.3 miles

Alternative E



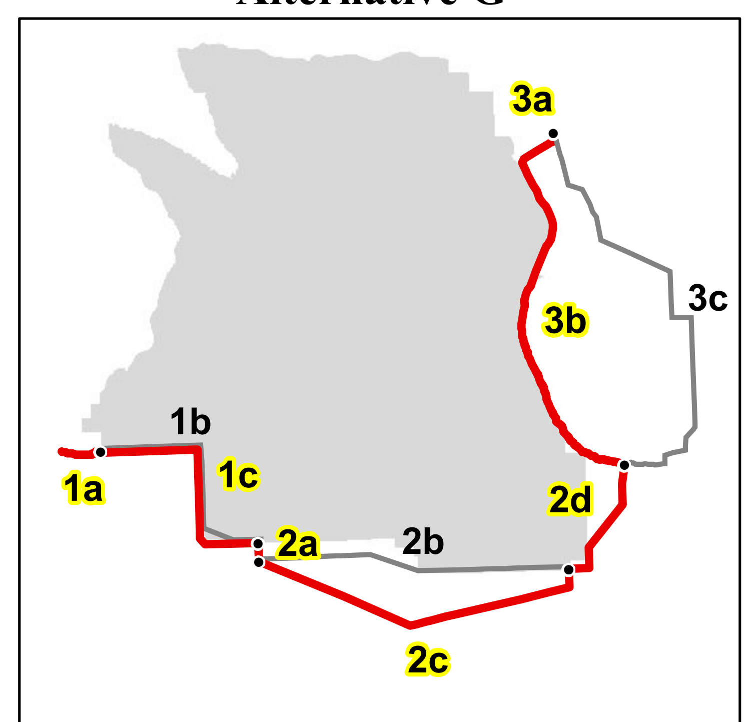
Total Length: 61.4 miles

Alternative F



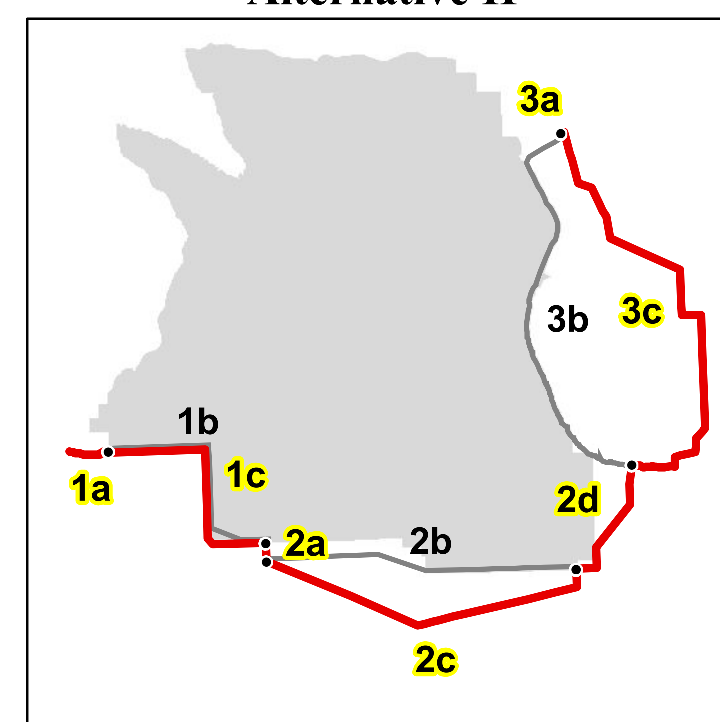
Total Length: 64.9 miles

Alternative G



Total Length: 63.2 miles

Alternative H



Total Length: 66.7 miles

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2.4 PROJECT ACTIVITIES AND FEATURES COMMON TO ACTION ALTERNATIVES

2.4.1 Transmission Line Design

This section describes the typical characteristics of the Project facilities.

2.4.1.1 New Vantage-Pomona Heights 230 kV Transmission Line Specifications

The typical design characteristics of the 230 kV transmission line are presented in Table 2-1. The components of the transmission line are described below, including structure types, foundations, conductors, insulators, and associated hardware and overhead groundwire.

2.4.1.2 Structures

The structures for the 230 kV transmission line will be either single circuit H-frame wood or steel poles, or single wood or steel poles depending on location. H-frame wood pole structures are proposed for most of the line located in open terrain. The H-frame tangent structures would be between 65 and 90 feet tall above the ground (and in some cases 100 feet tall), and spaced approximately 650 to 1,000 feet apart depending on terrain. In developed, agricultural or constrained areas single wood or steel pole structures would be used. The single pole tangent structures would be between 70 and 110 feet tall and spaced between 400 to 700 feet apart. Angle and dead-end structures would be guyed to ground anchors. For the Columbia River crossing, the structures would be approximately 200 foot tall lattice steel structures for the up to 2,800 foot crossing. The exact height of, and distance between, structures will be dictated by topographic and land use characteristics, and safety requirements for conductor clearances. Structure design characteristics are identified on Table 2-3 and illustrated in Figures 2-3 and 2-4.

2.4.1.3 Foundations

Direct Embedded-Wood/Steel Structures

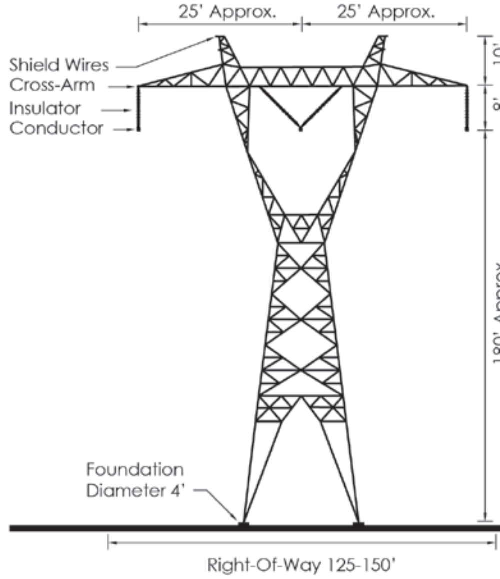
Poles would be placed in augured holes, directly embedded into the ground and typically do not require concrete foundations. The embedment depth for poles up to 95 feet tall is typically 10 percent of the pole length plus two feet; for poles 100 feet and taller, 10 percent of the pole length plus three feet.

Embedment depth is expected to be between nine and 15 feet based on the structure heights proposed for the Project. The actual depth will depend on load and soil characteristics. No foundations would be required for the wood pole structures except where necessary due to local terrain conditions, areas of uplift, and at transmission angle points. The diameter of the hole excavated for embedment is typically the pole diameter plus 18 inches. When a pole is placed in a hole, native or select backfill will be used to fill the voids around the perimeter of the hole.

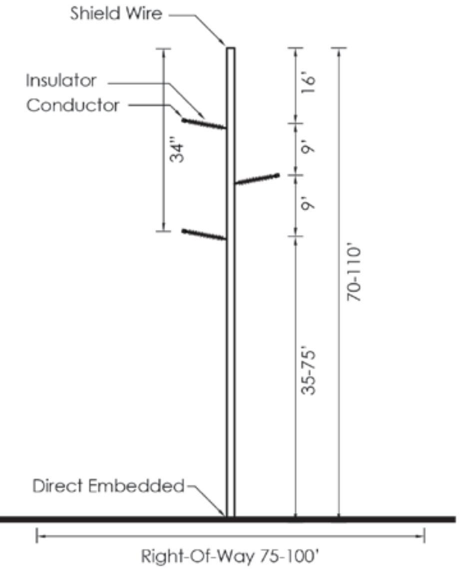
TABLE 2-3 DESIGN CHARACTERISTICS OF THE VANTAGE-POMONA HEIGHTS 230 KV TRANSMISSION LINE PROJECT

Line length	Approximately 65 miles
Type of structure	H-frame wood poles-open terrain Single wood or steel poles in agricultural, developed and constrained areas
Structure height	H-frame structures - 65 to 90 feet (up to 100 feet) Single poles - 70 to 110 feet
Average Span length	H-frame structures-650 to 1,000 feet Single poles - 400 to 700 feet
Number of structures per mile	H-frame structures - 6 to 8 Singles poles - 7 to 13
ROW width	H-frame structures - 125 -150 feet Single poles - 75 to 100 feet Dead-end and Angle structures-Additional ROW required for guys and anchors(area determined by structure height and angle)
Land disturbed (approximate):	
Temporary	
Structure Work Areas (H-frame Structures)	150 x 125 feet (18,750 square feet [sq. ft.])
(Single Poles)	150 x 80 feet (12,000 sq. ft.)
Turn-Around Areas	60 x 60 feet (3,600 sq. ft.)
Pulling and Tensioning Sites	125 x 400 feet (50,000 sq. ft.) Sites every 11,000 feet (2 miles) or less
Construction Yard/Staging Areas (existing disturbed areas)	5 acres; 3 yards required
Permanent	
Structure Base	
- H-frame	20 inch diameter each pole x 2 = 40 inches
- Single Pole	24 inches diameter
- Steel Lattice	4 footings, 60 x 60 feet (3,600 sq. ft.)
Work Pads	30 x 40 feet (1,200 sq. ft.)
Access Roads	Minimum 14 feet wide up to 24 feet wide by length, depending upon terrain
Access roads	Minimum 14 feet wide up to 24 feet wide by length, depending on terrain - Approximately 1.1 to 2.5 miles (depending on slope) of new road per mile of transmission line where new road would be required. Existing roads would be used whenever possible.
Voltage	230,000 volts alternating current (AC)
Circuit configuration	Single circuit with 3 phases per structure
Conductor size	1,272 kilo-circular mils (kcmil; 1.354 inch diameter) aluminum conductor steel reinforced (ACSR)
Ground clearance of conductor	28 feet minimum - up to 35 feet
Structure/Pole foundations	Poles generally would be placed in augured holes and tamped. Foundations may be required in rough terrain, uplift areas or large angles. Single circuit steel lattice structures for Columbia River crossing will require steel reinforced concrete drilled piers.

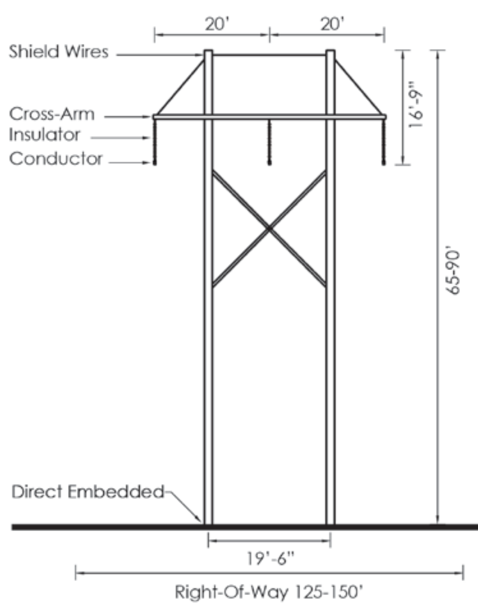
FIGURE 2-3 TYPICAL 230 KV STRUCTURE TYPES



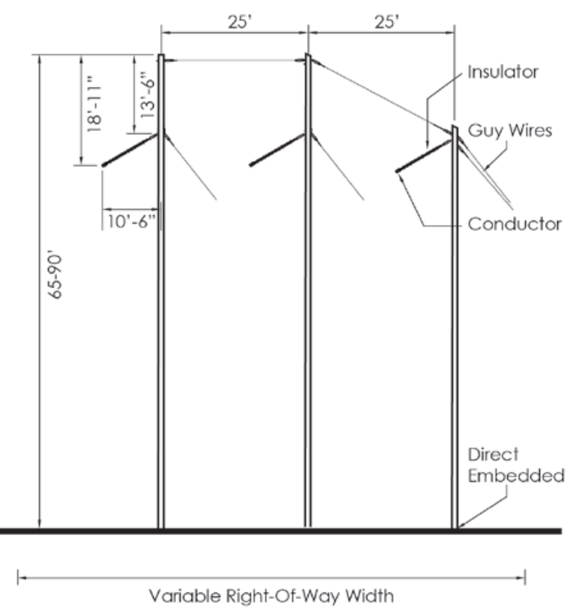
Single-Circuit 230 kV Steel Lattice Structure (Columbia River Crossing)



Single-Circuit 230 kV Single Pole Tangent Structure



Single-Circuit 230 kV H-Frame Tangent Structure



Single-Circuit 230 kV 3 Pole Angle-Guyed Structure

IMAGES NOT TO SCALE

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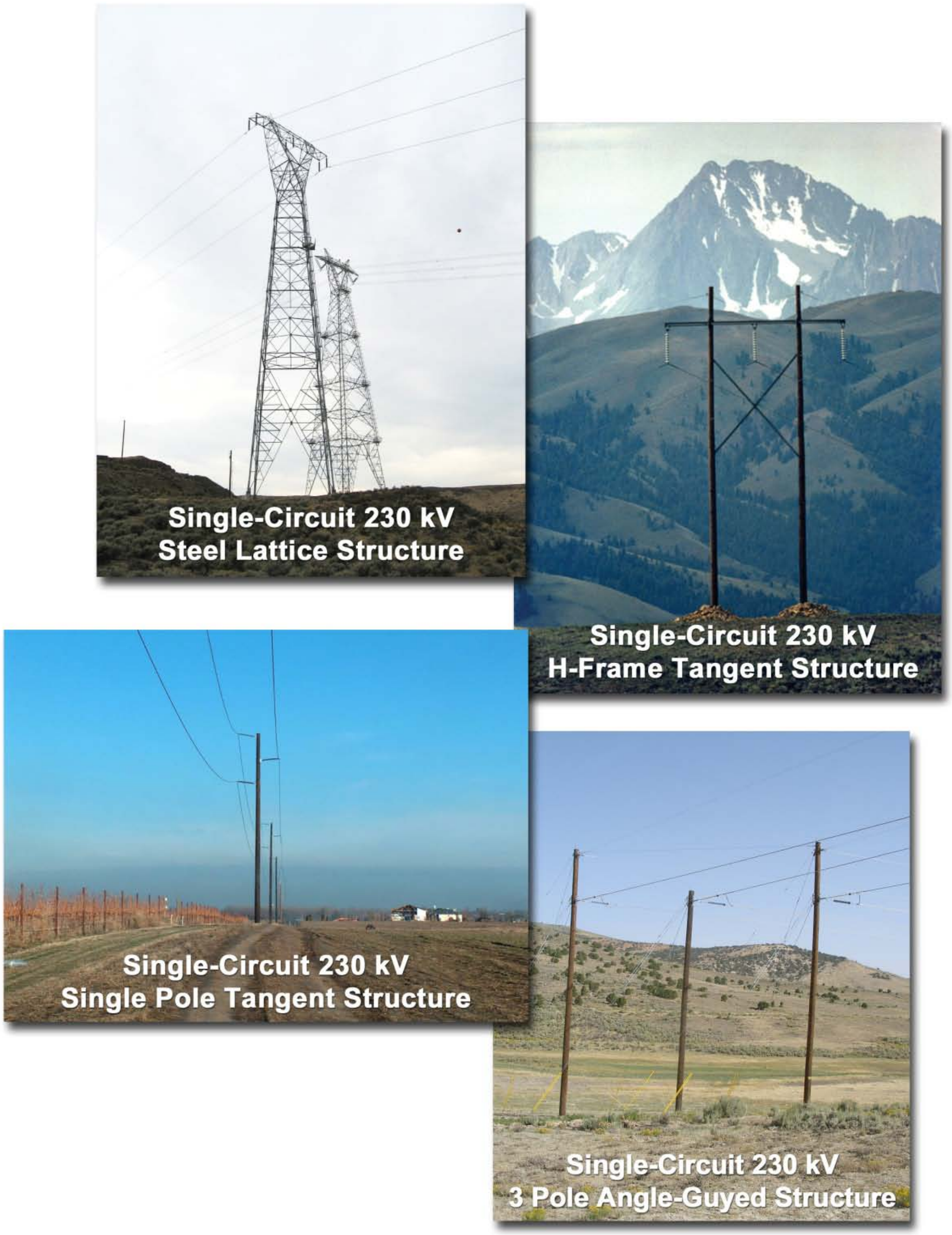
FIGURE 2-4 PHOTOGRAPHS OF TYPICAL 230 KV STRUCTURE TYPES



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Drilled Concrete Piers-Steel Lattice Structures

The Columbia River crossing single circuit lattice steel structures would require four foundations with one on each of the four corners of the lattice towers. The foundation diameter and depth would be determined during final design and are dependent on the type of soil or rock present at each specific site. Typically the foundations for the single-circuit tangent lattice towers would be composed of steel-reinforced concrete drilled piers with a typical diameter of four feet and a depth of approximately 15 feet.

2.4.1.4 Conductors

The conductor (the wire cable strung between transmission line structures through which the electric current flows) would be aluminum stranded with a steel stranded reinforced core. The aluminum carries the majority of the electrical current and the steel provides the tensile strength to support the aluminum strands. The conductor size would be 1,272 kcmil (1.354 inch diameter). The proposed transmission line would be designed for one 230 kV three phase (three conductors) circuit and two shield wires.

Conductor phase to phase and phase to ground clearance parameters are determined in accordance with the National Electric Safety Code (NESC) and Pacific Power (PacifiCorp) design standards. This code provides for minimum distances between the conductors and ground crossing points of other lines and the transmission support structure, and other conductors and minimum working clearances for personnel during energized operation and maintenance activities (IEEE 2007). Minimum conductor height above the ground or vegetation would be 28 to 35 feet. Minimum conductor clearances would dictate the exact height of each structure based on topography and safety clearance requirements. During detailed design, clearances may be increased to account for special situations that may arise in site specific locations.

2.4.1.5 Insulators and Associated Hardware

Insulators, which are made of an extremely low conducting material such as porcelain, glass or polymer, are used to suspend conductors from each structure. Insulators inhibit the flow of electrical current from the conductor to the ground or another conductor. The 230 kV transmission line would utilize polymer type insulators. The assemblies of insulators are designed to maintain electrical clearances between the conductors, structure and ground.

To protect conductors from lightning strikes, each structure would have two lightening protection shield wires installed near the top of each pole. Current from lightning strikes would be transferred through ground wires attached to structures into the ground. The shield wires would be grounded at regular intervals to meet NESC code and Pacific Power standards. One of the shield wires would be composed of extra high strength (EHS) steel wire with a diameter of 0.360 inches and a weight of 0.273 pound per foot. The second shield wire would be a fiber optic ground wire (OPGW) with a diameter of 0.465 inch and a weight of 0.2695 pound per foot. The OPGW would be constructed of aluminum and steel which carries glass fibers within its core. The glass fibers inside the OPGW shield wire would facilitate communications for relaying, system control and monitoring

2.4.1.6 Right-of-Way Acquisition

Acquisition of Right-of-Way Across Federal Lands

New permanent and temporary land rights are required for the transmission line facilities, such as the transmission line ROW, access roads and temporary work sites (e.g., ROW grant, easement, license agreement, franchise agreement and fee simple).

The proponent has filed ROW applications with the BLM, JBLM YTC, and Reclamation for transmission facilities located on federal land. The grant of ROW required would be:

- A width of between 125 feet and 150 feet for H-frame structures and 75 feet to 100 feet for single pole structures and for a specific number of miles across federal land.
- For a specific period of time (50 years with renewal for the expected useful life of the Project).
- For that amount of additional ROW acreage that may be needed for access roads located outside of the transmission line ROW.

A ROW Grant issued under the Federal Land Policy and Management Act (FLPMA) is primarily dependent upon a reasonable period needed to accomplish the purpose of the authorization. ROW Grants under FLPMA generally do not exceed 30 years, except that grants up to 50 years may be issued for major ROW facilities/systems such as an electric transmission line 230 kV or greater (BLM Policy and Procedures for Issuance of Long Term ROW Grants and Easements under 43 Code of Federal Regulations [C.F.R.] 2800 and 2880, June 2007). Also, it is standard practice that a provision is included in the ROW Grant that the term of the grant may be renewed if the expected useful life of the facility would extend beyond the initial term of the ROW Grant. Once a Record of Decision (ROD) has been issued, the applications would be finalized with Project design details.

Acquisition of Right-of-Way Across Non-Federal Lands (State and Private)

ROW for transmission line facilities on non-federal lands would be purchased in perpetual easements. Every effort would be made to purchase land rights on private lands through reasonable negotiations with current owners.

All land rights would be acquired in accordance with federal and state laws and regulations. Once a route for the transmission line has been selected, a list of all landowners with title to property lying within the transmission line ROW would be obtained from county records. Permission to enter the property would be requested from the landowners for Project personnel to conduct surveys, real property appraisals, environmental studies, and geotechnical studies. From survey data of the transmission line and access roads ROWs, detailed legal descriptions would be prepared, and tract plats of the land rights to be acquired would be drawn.

After title evidence is obtained and land valuation and legal descriptions are completed, realty specialists would present formal offers to acquire the necessary land rights. Land rights would be acquired in the form of an easement contract for transmission line ROW. The realty specialist would explain the Project and contract to the landowners. If agreeable to both the landowner and realty specialist, the contract would be signed.

The executed contract would be recorded in the official records of the county, and the ROW would be insured with title insurance. The landowners would be paid the amount of the contract's consideration. All costs incidental to the contract's execution, such as recording fees, closing costs, and title insurance fees would be paid by Pacific Power. However, if a necessary easement cannot be acquired through negotiation, Pacific Power may, in certain circumstances, acquire the easement through eminent domain (condemnation) proceedings. Federal and state laws grant utilities the power to acquire, through the courts, if necessary, property rights for facilities to be built in the public interest. Eminent domain proceedings are a last resort and are only used if an agreement cannot be reached. Through the eminent domain process, a court determines the just compensation paid to the landowner.

After completion of construction, realty specialists would work with landowners to settle any construction damages to landowner property.

2.4.2 Substation Upgrades

2.4.2.1 Pomona Heights Substation

The new 230 kV line would enter Pacific Power's Pomona Heights substation on the northwest edge of the substation. All new equipment would be installed within the existing substation fence. A new H-frame terminal structure would be required. New line breakers, new switches, various bus connections and other minor equipment and wiring would be installed to incorporate the new line into the interconnected grid.

2.4.2.2 Vantage Substation

The Vantage substation is owned by BPA. A currently occupied bay would be vacated within the substation for termination of the new 230 kV line. The new line would enter the east area of the substation. BPA would design and install the new equipment to interconnect the new 230 kV line. All new equipment would be installed within the existing substation fence.

2.4.3 Transmission Line Construction

Pacific Power would not initiate any construction or other surface disturbing activities on the public land portion of the ROW until written approval of the BLM, JBLM YTC, or Reclamation Authorized Officer is obtained. The specific authorization would consist of a written Notice to Proceed (Form 2800-15).

Preconstruction conferences with each of the affected agencies would be conducted in order to introduce the contractors and their field representatives, discuss mitigation measures and schedules and introduce each agency's point of contact prior to commencement of construction. As construction proceeds, the construction engineer or inspector would continue to monitor activities and ROW authorization to ensure compliance or to initiate modifications, where necessary. In environmentally sensitive areas, an environmental specialist with appropriate qualifications (i.e., biologist, archaeologist) would monitor construction activities to ensure compliance with specific protections and/or mitigation as required. Following completion of the construction, the line would be mapped as built, and separate packages would be submitted to each of the various agencies to close the construction process. Post-construction meetings with each of the agencies may be necessary to review the construction process.

The following sections detail the transmission line construction activities and procedures for the Vantage-Pomona Heights 230 kV Transmission Line Project. Construction equipment and work force requirements are described in Section 2.4.3.13.

Construction of the transmission line is discussed in the following sections according to the sequence of activities listed below.

1) Centerline of transmission line surveyed and staked
2) Access roads identified and constructed where necessary
3) ROW and structure sites cleared
4) Work areas and set-up sites cleared as needed
5) Materials distributed along centerline
6) Holes dug for transmission line structures
7) Structures framed and erected
8) Conductors and ground wires installed
9) Construction sites cleaned-up and reclaimed

2.4.3.1 Surveying the Centerline

The engineering survey would involve verifying and staking the centerline of the transmission line route, ROW boundaries, and access roads (where needed), spur roads to structure sites, structure locations and temporary work areas. Required cultural and biological resource surveys may begin once certain survey information is available and land rights are obtained. Depending on the route approved in the ROD, the centerline may be adjusted to accommodate engineering requirements and local modifications.

2.4.3.2 Disturbance Model, Access Roads and Ground Disturbance Assumptions

Construction of the new 230 kV transmission line would require vehicle, truck and crane access to each new structure site for construction crews, materials and equipment. Roads enable access to the ROW and structure sites for both construction and long-term maintenance of the transmission line. Short term, temporary impacts and long term, permanent impacts created as a result of Project construction, operations and maintenance were modeled along the assumed centerlines based on assumptions as described below. This disturbance model was utilized to determine impacts on resources.

Transmission line ROW access would be via a combination of new access roads, overland access, improvement to existing roads and use of existing terrain or roads as is. Roads would be upgraded or constructed in accordance with the Proponents standards for road construction, or according land management agency requirements (such as BLM Manual 9113 1985). However, existing paved and unpaved roads and trails would be used where possible, for the transportation of materials and equipment from the storage yards to the areas where they would be needed along the transmission line ROW. All construction access on federally managed public lands is subject to approval prior to construction. Other federal, state, and local landowners may require approvals before road construction could begin on their property.

Private landowners and affected agencies or land users would be consulted before road construction begins. Specific plans for the construction, rehabilitation, and/or maintenance of roads, including the general locations of access roads, would be documented in the Plan of Development (POD). These plans would incorporate relevant criteria from the agencies and landowners.

Where the proposed transmission line would parallel existing transmission lines or other linear features, the access roads along the existing utilities would be used wherever possible to minimize the amount of new road construction. However, these roads may require upgrading before they could be used for construction. All roads existing prior to construction would be left in a condition equal to or better than the condition prior to construction. Wherever existing roads could be used, only spur roads to structure sites may be needed.

In some areas, only temporary roads would be needed. Typically, these temporary roads would be graded to a travel surface width of approximately 14 feet minimum (up to 24 feet maximum) depending on terrain. Turnout areas and curves in the road would require a wider surface width. Normally, a ditch drainage system would not be constructed for temporary roads.

Permanent access roads would be constructed where needed for construction and long-term maintenance. Permanent access roads would be graded to a travel surface width of approximately 14 feet minimum (up to 24 feet maximum) including back slopes and side cast material depending on terrain and radius of road curve. Turnout areas and curves in the road would require a wider surface width. Culverts or other drainage structures would be installed as necessary across drainages, but the roads would usually follow the natural grade. Wherever possible, roads would be built at right angles to drainages. Clearings for construction of new roads or maintenance of existing roads typically occur five feet beyond the edge of the roadway on level ground. On hillside cuts or fills, clearings would be sufficient width to install the cut or fill without interference. According to the Proponent's road development standards (PacifiCorp 2008), where side slopes exceed 60 percent, a full bench cut would be reburied to stabilize the slope bases. No side-casting of material would be allowed in these areas; end-haul of material (dump areas of removed earth where necessary) would be required to a designated location as approved by the landowner or land management agency. The level of ongoing maintenance of permanent roads would be determined by Pacific Power's local maintenance and operations crews.

Overland access would occur in areas where no grading would be needed and would be used to the greatest extent possible. Overland travel would consist of "drive and crush" and/or "clear and cut" travel. Drive and crush is vehicular travel to access a site without significantly modifying the landscape. Vegetation is crushed but not cropped. Soil is compacted but no surface soil is removed. Clear and cut is the removal of vegetation in order to improve or provide suitable access for equipment. Vegetation is removed using above ground cutting methods that leave the root crown intact. Soil is compacted but no surface soil is removed. In areas of dense vegetation, the surface organic material would be stripped from the ground within the roadway and cut or filled in some areas. Stripping would occur to a maximum depth of six inches unless it is necessary as deemed appropriate by the engineer. The stripped area would be compacted as necessary to provide an adequate surface.

In certain areas, it could be necessary to block roads after construction to restrict future access for general and undesired use. Such areas would be identified through negotiations with the landowner or land management agency. Methods for road closure or management may include installing locking gates or obstructing the path with earthen berms or boulders. Blocked access routes would have to be reopened, when necessary (for Project maintenance, repair, inspection, etc.) where right-of-access is impeded.

For the purposes of calculating estimated impacts created as a result of the Project and its' alternatives, eight levels of access (Levels 0 through 7) were developed. These Access Levels were based on the development standards detailed above, and were numerically arranged based on the anticipated ground disturbance expected, with the lowest level (Level 0) having the lowest ground disturbance per mile of transmission line and the highest level (Level 7) having the most. Level 0 was assigned in areas where no ground disturbance is anticipated due to the presence of existing disturbance (e.g., agricultural areas), the crossing of surface water, or severe slopes where no road construction would occur. The access levels were developed based on the presence of existing roads and their current conditions, and the anticipated road construction based on slope and vegetation cover. Access Levels were assigned for each 0.1 mile increment along the Project alternatives (see Appendix A: Map 1 – Access Map). The ground disturbance levels are summarized in Table 2-5.

Tables 2-6 and 2-7 summarize short-term and long-term disturbance assumptions by route segment and alternative. These disturbance calculations are based on engineering, construction, operations and maintenance requirements of the 230 kV transmission line, and were calculated in addition to the access road assumptions. Table 2-6 shows summary calculations of short-term, construction related impacts associated with work areas necessary for the installation and assembly of H-frame, single pole and steel lattice structures and conductor pulling and tensioning sites as described in Chapter 2.4.3.3 through 2.4.3.6. Areas of assumed single pole use based on engineering and land use constraints such as restrictive ROW, residential and agricultural areas. The appropriate calculation was then made based on the use of H-frame or single pole structures and number of angle/dead end structures (e.g., number of poles per mile, number of angle/dead end structures) for each route segment. The disturbance area for pulling and tensioning sites was evenly distributed across each route segment or alternative (e.g., 50,000 sq. ft. every two miles or 2,500 sq. ft. per 0.1 mile increment) to account for this disturbance along short segments. Table 2-7 summarizes the long term disturbance calculations associated with the auguring and installation of poles and foundations as described in Section 2.4.3.4, and the clearing and leveling of work pads in areas over eight percent slope for the installation of structures as described in Section 2.4.3.4 by route segment and alternative. A summary total of short term and long term disturbance based access roads, temporary work areas and set-up areas is shown in Table 2-8.

Access levels were developed along the assumed Project centerline by determining the location and condition of existing roads within the Project corridors. During preliminary engineering, Pacific Power identified areas where helicopter construction would occur due to extreme slope and access limitations. These areas, as well as those areas where no road construction would occur because of the presence of water and agricultural areas, were assigned an Access Level 0, and no ground disturbance was assumed related to access road construction (other permanent and temporary disturbance, such as structure base disturbance, was estimated). To determine the potential impact of access roads in other areas, existing roads, slope and vegetation was considered. Existing roads were assigned a Level 1 or Level 2 designation, considering the extent to which they may require improvement. Typically, paved, gravel and wide dirt roads were given an Access Level 2, and were assumed to require minimal improvements. Within approximately 750 feet of the Access Level 2 or 3 existing road, the assumed Project centerline was assigned the corresponding Access Level, with a lower level given if both Level 2 and 3 were present within 750 feet of the assumed centerlines. These criteria were used in areas with generally unrestricted access. Some roads were not considered accessible even if they were within 750 feet of the assumed centerlines. Specifically, it was assumed that route segments would not be accessible from restricted roads located within the JBLM YTC unless that route segment was located on JBLM YTC lands (e.g., Route 1b).

Areas beyond 750 feet of an existing road were then assessed to determine the extent of potential road construction. During this access road assessment phase, areas where annual grassland vegetation or previously disturbed areas were identified based on GAP vegetation cover. In these areas, where slopes were less than eight percent, it was assumed that centerline access would be possible without grading new roads (overland access). Some isolated areas may require the laying of gravel or other ground disturbing activities (10% of 14 foot travelway groomed and graded where necessary). To determine the extent of new road construction, ground slope was determined based on digital terrain modeling. Intersection of the assumed centerline with the digital terrain model slope class (0 to 8%, 8 to 15%, etc.) determined access levels for each 0.1 mile increment where no existing roads occur and where overland access is not likely to occur.

TABLE 2-4 ACCESS LEVELS AND GROUND DISTURBANCE

ACCESS LEVEL	ACCESS SUMMARY	DISTURBANCE ASSUMPTIONS
Level 0	No Roads (Overland Access in agriculture, river crossing, or helicopter construction). No preparation required.	Existing Agriculture; Crossing of the Columbia River (open water), and steepest areas of the Umtanum Ridge and Saddle Mountains (helicopter construction); no road construction necessary.
Level 1	Overland Access in Flat Areas, Limited Disturbance in Flat Terrain (0 to 8%)	Low ground disturbance for new access road construction; assume generally overland access across grassy/low veg. areas and limited areas of grooming and grading; 4-5 inches of crushed rock applied in limited areas. Assume 10% of travel way graded, groomed, and/or graveled.
Level 2	Existing Improved Roads	Previously disturbed. Roads generally are in good condition but may require small improvements at stream crossings, steep slope areas, and other locations. New ground disturbance would be minimal. New spur roads would be required to access each structure site; an average of 300 feet of new spur road for each structure. Spur roads would disturb approximately 0.4 acres per mile of transmission line.
Level 3	Roads that Require Improvement	Previously disturbed. Existing two-track or narrow unimproved roads would require improvement to make roads serviceable (e.g., mowing, grading) for construction. Low ground disturbance; assume approximately 0.5 to 1.0 miles of road improvements for each mile of transmission line. Road improvements would disturb approximately 0.75 to 1.0 acres per mile of transmission line. An average of 300 feet of spur roads would be required to access each structure site. Spur roads would disturb about 0.4 acres per mile of transmission line.
Level 4	Construct Road in Flat Terrain (0 to 8%)	Low to Moderate ground disturbance for new access road construction; assume approximately 1.0 to 1.2 miles of new roads would be required for each mile of transmission line. Road construction would disturb approximately 1.7 to 2.0 acres per mile of transmission line.
Level 5	Construct Road in Sloping Terrain (8 to 15%)	Moderate ground disturbance for new access road construction; assume 1.2 to 1.5 miles of new road would be required for each mile of transmission line. Road construction would disturb approximately 2.0 to 2.5 acres per mile of transmission line.
Level 6	Construct Road in Steep Terrain (15 to 30%)	Moderate to high ground disturbance for new access road construction; assume approximately 1.5 to 2.0 miles of new road would be required for each mile of transmission line. Road construction would disturb approximately 2.5 to 3.4 acres per mile of transmission line.
Level 7	Construct Road in Very Steep Terrain (over 30%)	High to very high ground disturbance for new access road construction; assume approximately 2.0 to 3.0 miles of new road would be required for each mile of transmission line. Road construction would disturb approximately 3.4 to 5.0 acres per mile of transmission line.

Access Assumptions:

1) Permanent new access roads would be graded to travel service width of 14 feet, including back slopes and side cast material.
2) Spur roads would be an average of 300 feet in length.

Two access models were utilized to determine ground disturbance. Access Model-A considered the worst case scenario as described above, where Route Segments (1c and 2b) may be within 750 feet of an existing road located on JBLM YTC, but would not utilize restricted access base roads on JBLM YTC. In this model, Route Segment 1b, located on JBLM YTC, would use base roads because the segment is located on Army lands. Access Model B would also use JBLM YTC roads for Route Segment 1b access because it is located on Army lands, but also assumes the use of U.S. Department of the Army (Army) roads for Route Segment 1c and 2b access (located on private, state and/or BLM lands). This would eliminate the need for new road construction in areas where no roads currently exist, and where the JBLM

YTC perimeter (fire break) road could be utilized for Project construction and maintenance, thus reducing potential ground disturbance. Ground disturbance calculations for each access road scenario are presented in Table 2-5 below.

2.4.3.3 Work Areas and Set-up Sites

Work areas are required at each structure site to facilitate the safe operation of equipment and construction operations. The size of the work area is driven by the need to lay down the poles, install the necessary hardware and frame them to full length. A temporary disturbance area of approximately 150 feet by 125 feet (18,750 sq. ft.) would be required at each H-frame structure location and an area of approximately 150 feet by 80 feet (12,000 sq. ft.) for single pole structure location.

Side hill construction would occur in certain areas that would require a leveled trail be established to access the structure location, as well as pad or leveled area to allow for equipment set-up for installation of the poles. Typically, the blading for the trail would not exceed 12 feet, depending on the hill slope. The blading for the building pad would be done along the same area as the access road to reduce the overall amount of blading required for crane set-up, and would not typically exceed 30 by 40 feet at the structure.

Pulling and tensioning sites for stringing the conductor would result in a temporary disturbance of 125 by 400 feet (50,000 sq. ft.). Sites for pulling and tensioning would be located approximately every 11,000 feet (two miles) or less. This is the length of the longest reel of conductor that would be utilized by the Project. For mid-span setups, work areas are located within the 125-foot ROW and up to 250 feet in length. Setup sites for corners and heavy angles are the width of the ROW and up to 250 feet in length on both sides to allow for equipment to be set up in line with the pulling of the conductor. Additional set up sites would be selected by the contractor. Where feasible, all areas would be selected to allow access of equipment from roads and trails without requiring them to travel long distances on the ROW, and located to be in more level areas so that blading would not be required.

TABLE 2-5 ACCESS ROAD DISTURBANCE BY SEGMENT AND ALTERNATIVE

	SHORT TERM DISTURBANCE		LONG TERM DISTURBANCE				TOTAL SHORT TERM ACCESS DISTURBANCE		TOTAL LONG TERM ACCESS DISTURBANCE	
	Overland Access 14' wide by length, (Access Level 1)		Improve Existing Roads and Construct New Spur Roads (Access Levels 2 or 3)		Blade New, 14' wide x length (Access Levels 4, 5, 6, or 7)					
	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres
ACCESS MODEL A (NO JBLM YTC ROADS USED FOR ROUTES ON PRIVATE/STATE/BLM LANDS)										
Route Segments										
1a	0	0	67,620	1.55	0	0	0	0	67,620	1.55
1b	0	0	332,220	7.63	97,574	2.24	0	0	429,794	9.87
1c	2,218	0.05	285,180	6.55	650,866	14.94	2,218	0.05	936,046	21.49
2a	0	0	14,700	0.34	73,181	1.68	0	0	87,881	2.02
2b	2,957	0.07	138,180	3.17	1,355,323	31.11	2,957	0.07	1,493,503	34.29
2c	8,131	0.19	370,440	8.50	586,925	13.47	8,131	0.19	957,365	21.98
2d	0	0	108,780	2.50	510,418	11.72	0	0	619,198	14.21
3a	0	0	5,880	0.13	0	0	0	0	5,880	0.13
3b	0	0	626,220	14.38	703,718	16.16	0	0	1,329,938	30.53
3c	2,957	0.07	635,040	14.58	451,651	10.37	2,957	0.07	1,086,691	24.95
Alternative										
A	5,914	0.14	1,302,420	29.90	2,488,147	57.12	5,914	0.14	3,790,567	87.02
B	2,957	0.07	1,293,600	29.70	2,740,214	62.91	2,957	0.07	4,033,814	92.60
C	8,131	0.19	1,525,860	35.03	1,971,816	45.27	8,131	0.19	3,497,676	80.30
D (Agency Preferred Alternative)	11,088	0.25	1,534,680	35.23	1,719,749	39.48	11,088	0.25	3,254,429	74.71
E	5,174	0.12	1,246,560	28.62	3,293,506	75.61	5,174	0.12	4,540,066	104.23
F	8,131	0.19	1,255,380	28.82	3,041,438	69.82	8,131	0.19	4,296,818	98.64
G	10,349	0.24	1,478,820	33.95	2,525,107	57.97	10,349	0.24	4,003,927	91.92
H	13,306	0.31	1,487,640	34.15	2,273,040	52.18	13,306	0.31	3,760,680	86.33

	SHORT TERM DISTURBANCE		LONG TERM DISTURBANCE				TOTAL SHORT TERM ACCESS DISTURBANCE		TOTAL LONG TERM ACCESS DISTURBANCE	
	Overland Access 14' wide by length, (Access Level 1)		Improve Existing Roads and Construct New Spur Roads (Access Levels 2 or 3)		Blade New, 14' wide x length (Access Levels 4, 5, 6, or 7)					
	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres
ACCESS MODEL A (NO JBLM YTC ROADS USED FOR ROUTES ON PRIVATE/STATE/BLM LANDS)										
Route Segments										
1c	0	0	376,320	8.64	0	0	0	0	376,320	8.64
2b	2,957	0.07	338,100	7.76	624,624	14.34	2,957	0.07	962,724	22.10
Alternative										
A	5,914	0.14	1,502,340	34.49	1,757,448	40.35	5913.6	0.1	3,259,788	74.83
B	2,957	0.07	1,493,520	34.29	2,009,515	46.13	2956.8	0.1	3,503,035	80.42
E	2,957	0.07	1,537,620	35.30	1,911,941	43.89	2956.8	0.1	3,449,561	79.19
F	5,914	0.14	1,546,440	35.50	1,659,874	38.11	5913.6	0.1	3,206,314	73.61
G	8,131	0.19	1,569,960	36.04	1,874,242	43.03	8131.2	0.2	3,444,202	79.07
H	11,088	0.25	1,578,780	36.24	1,622,174	37.24	11088.0	0.3	3,200,954	73.48

TABLE 2-6 AREAS WITH SHORT TERM, TEMPORARY DISTURBANCE BY SEGMENT AND ALTERNATIVE

	WORK AREAS										TOTAL SHORT TERM STRUCTURE AND WORK AREA DISTURBANCE	
	TANGENT H-FRAME STRUCTURES		TANGENT SINGLE POLE STRUCTURES		ANGLE/DEAD END STRUCTURES		STEEL LATTICE		PULLING AND TENSIONING SITES			
	150' x 125' (18,750 sq. ft.)		150' x 80' (12,000 sq. ft.)		125' x 125' (15,625 sq. ft.)		200' x 250' (50,000 sq. ft.)		125' x 400' (50,000 sq. ft.)			
Route Segment	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres
1a	0	0	276,000	6.34	109,375	2.51	0	0	57,500	1.32	**442,875**	**10.17**
1b	1,653,750	37.96	0	0	62,500	1.43	0	0	315,000	7.23	**2,031,250**	**46.63**
1c	1,365,000	31.34	312,000	7.16	78,125	1.79	0	0	325,000	7.46	**2,080,125**	**47.75**
2a	131,250	3.01	0	0	15,625	0.36	0	0	25,000	0.57	**171,875**	**3.95**
2b	2,152,500	49.41	0	0	31,250	0.72	0	0	410,000	9.41	**2,593,750**	**59.54**
2c	2,165,625	49.72	204,000	4.68	46,874	1.08	0	0	455,000	10.45	**2,871,499**	**65.92**
2d	931,875	21.39	0	0	46,875	1.08	0	0	177,500	4.07	**1,156,250**	**26.54**
3a	26,250	0.60	0	0	15,625	0.36	0	0	5,000	0.11	**46,875**	**1.08**
3b	341,250	7.83	2,304,000	52.89	62,501	1.43	100,000	2.30	545,000	12.51	**3,352,747**	**76.97**
3c	1,811,250	41.58	1,380,000	31.68	234,374	5.38	100,000	2.30	632,500	14.52	**4,158,124**	**95.46**
Alternative												
A	6,706,875	153.97	1,656,000	38.02	515,624	11.84	100,000	2.30	1,622,500	37.25	**10,600,999**	**243.37**
B	5,236,875	120.22	2,580,000	59.23	343,750	7.89	100,000	2.30	1,535,000	35.24	**9,795,622**	**224.88**
C	5,250,000	120.52	2,784,000	63.91	359,374	8.25	100,000	2.30	1,580,000	36.27	**10,073,371**	**231.25**
D (Agency Preferred Alternative)	6,720,000	154.27	1,860,000	42.70	531,248	12.20	100,000	2.30	1,667,500	38.28	**10,878,748**	**249.74**
E	4,948,125	113.59	2,892,000	66.39	359,375	8.25	100,000	2.30	1,545,000	35.47	**9,844,497**	**226.00**
F	6,418,125	147.34	1,968,000	45.18	531,249	12.20	100,000	2.30	1,632,500	37.48	**10,649,874**	**244.49**
G	4,961,250	113.89	3,096,000	71.07	374,999	8.61	100,000	2.30	1,590,000	36.50	**10,122,246**	**232.37**
H	6,431,250	147.64	2,172,000	49.86	546,873	12.55	100,000	2.30	1,677,500	38.51	**10,927,623**	**250.86**

* All Alternatives will require an additional three sites totaling five acres (217,800 sq. ft.) for Construction Yard/Staging Areas on previously disturbed land

TABLE 2-7 AREAS WITH LONG TERM, PERMANENT DISTURBANCE BY SEGMENT AND ALTERNATIVE

	STRUCTURES										TOTAL LONG TERM STRUCTURE AND WORK AREA DISTURBANCE	
	TANGENT H-FRAME STRUCTURES 20" Diameter Poles (2) + auger holes = 7.5 sq. ft. x 2 =**15 sq. ft. per structure**		TANGENT SINGLE POLE STRUCTURES 24" Diameter Pole + auger hole = **8 sq. ft. per structure**		ANGLE/DEAD END STRUCTURES 30" Diameter Poles (3) + auger holes + guys = 7 sq. ft. x 3 **=24 sq. ft. per structure**		STEEL LATTICE 4 Footings, 60'x60' (3,600 sq. ft.)		WORK PADS AT EACH STRUCTURE 30x40' (1,200 sq. ft.) >8% slope			
Route Segment	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres
1a	0	0	184	0	168	<0.01	0	0	9600	0.22	**9,952**	**0.23**
1b	1,323	0.03	0	0	96	<0.01	0	0	59,640	1.37	**61,059**	**1.40**
1c	1,092	0.03	208	0	120	<0.01	0	0	68,400	1.57	**69,820**	**1.60**
2a	105	0.00	0	0	24	<0.01	0	0	1,680	0.04	**1,809**	**0.04**
2b	1,722	0.04	0	0	48	<0.01	0	0	60,480	1.39	**62,250**	**1.43**
2c	1,733	0.04	136	0	72	<0.01	0	0	27,720	0.64	**29,661**	**0.68**
2d	746	0.02	0	0	72	<0.01	0	0	47,880	1.10	**48,698**	**1.12**
3a	21	<0.01	0	0	24	<0.01	0	0	0	0	**45**	**<0.01**
3b	273	0.01	1,536	0.04	96	<0.01	7,201	0.17	7,800	0.18	**16,906**	**0.39**
3c	1,449	0.03	920	0.02	360	0.01	7,200	0.17	48,720	1.12	**58,649**	**1.35**
Alternative												
A	5,366	0.12	1,104	0.03	792	0.02	7,200	0.17	228,000	5.23	**242,451**	**5.57**
B	4,190	0.10	1,720	0.04	528	0.01	7,201	0.17	187,080	4.29	**200,657**	**4.61**
C	4,200	0.10	1,856	0.04	552	0.01	7,201	0.17	154,320	3.54	**168,044**	**3.86**
D (Agency Preferred Alternative)	5,376	0.12	1,240	0.03	816	0.02	7,200	0.17	195,240	4.48	**209,838**	**4.82**
E	3,959	0.09	1,928	0.04	552	0.01	7,201	0.17	195,840	4.50	**209,409**	**4.81**
F	5,135	0.12	1,312	0.03	816	0.02	7,200	0.17	236,760	5.44	**251,203**	**5.77**
G	3,969	0.09	2,064	0.05	576	0.01	7,201	0.17	163,080	3.74	**176,796**	**4.06**

	STRUCTURES											
	TANGENT H-FRAME STRUCTURES 20" Diameter Poles (2) + auger holes = 7.5 sq. ft. x 2 =**15 sq. ft. per structure**		**TANGENT SINGLE POLE STRUCTURES** 24" Diameter Pole + auger hole = **8 sq. ft. per structure**		**ANGLE/DEAD END STRUCTURES** 30" Diameter Poles (3) + auger holes + guys = 7 sq. ft. x 3 **=24 sq. ft. per structure**		**STEEL LATTICE** 4 Footings, 60'x60' (3,600 sq. ft.)		**WORK PADS AT EACH STRUCTURE** 30x40' (1,200 sq. ft.) >8% slope		**TOTAL LONG TERM STRUCTURE AND WORK AREA DISTURBANCE**	
Route Segment	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres	Square Feet	Acres		Acres
H	5,145	0.12	1448	0.03	840	0.02	7200	0.17	204,000	4.68	**218,590**	**5.02**

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TABLE 2-8 TOTAL DISTURBANCE BY ROUTE SEGMENT AND ALTERNATIVE

	TOTAL SHORT TERM DISTURBANCE		TOTAL LONG TERM DISTURBANCE	
	Square Feet	Acres	Square Feet	Acres
UTILIZING ACCESS MODEL A AND OTHER DISTURBANCE				
Route Segment				
1a*	442,875	10.17	77,572	1.78
1b*	2,031,250	46.63	490,853	11.27
1c	2,082,342	47.80	1,005,866	23.09
2a*	171,875	3.95	89,690	2.06
2b	2,596,707	59.61	1,555,753	35.72
2c*	2,879,630	66.11	987,025	22.66
2d*	1,156,250	26.54	667,895	15.33
3a*	46,875	1.08	5,925	0.14
3b	3,352,747	76.97	1,346,844	30.92
3c*	4,161,081	95.53	1,145,341	26.29
Alternative				
A	10,606,913	243.50	4,033,029	92.59
B	9,798,579	224.94	4,234,532	97.21
C	10,081,502	231.44	3,665,805	84.16
D (Agency Preferred Alternative)	10,889,836	250.00	3,464,301	79.53
E	9,849,671	226.12	4,749,545	109.03
F	10,658,005	244.67	4,548,041	104.41
G	10,132,595	232.61	4,180,817	95.98
H	10,940,928	251.17	3,979,313	91.35
UTILIZING ACCESS MODEL B AND OTHER DISTURBANCE				
Route Segment				
1c	2,080,125	47.75	446,140	10.24
2b	2,596,707	59.61	1,085,454	24.92
Alternative				
A	10,606,913	243.50	3,730,250	85.63
B	9,798,582	224.94	3,890,833	89.32
E	9,847,457	226.07	3,786,480	86.93
F	10,655,788	244.62	3,625,896	83.24
G	10,130,380	232.56	3,715,771	85.30
H	10,938,711	251.12	3,555,188	81.62

* Agency Preferred Route

Turn-around areas would be required in certain areas along the ROW where construction travel would be restricted by rock outcrops, washes, ravines, canals, or sensitive habitat areas. The turn-around areas would be located at the last structure that can access an area, as well as the first structure on the other side of the restricted access area. Turn-around areas typically occupy an area of 60 feet x 60 feet or 3,600 square feet. Specific structure locations and work areas would be identified in the POD once a final route has been determined.

2.4.3.4 Pole and Foundation Installation

Wood/Steel Structure Direct Burial

Generally, pole excavations would be created with a vehicle-mounted power auger. Where conditions require the installation of pole foundations, excavations will be created with a backhoe or vehicle-mounted power auger. In extremely sandy areas, soils may be stabilized during excavation through the use of water or a gelling agent. An example of a gelling agent is "Novagel ™" which acts as a viscosifier/soil stabilizer so that during foundation drilling the sidewalls do not collapse during the drilling process. After excavation is complete, the structures would be put in place by direct burial. Excavation activities would require access by the necessary equipment, including power auger or drill, crane, and material trucks. Refer to Table 2-9 for a list of the equipment and personnel necessary for installation of poles and foundations.

Poles would be placed in holes or foundations as soon as the holes are ready. In rare instances where holes are left open for any period of time, they would be covered and/or fenced to protect the public, livestock, and wildlife. Soils removed from holes would be stockpiled on the work area and used to backfill holes. All remaining soil not needed for backfilling would be spread on the work area.

Single Steel Pole and Lattice Steel Structure Foundations

Some single steel poles and the lattice steel structures for the Columbia River crossing would require the installation of foundations which are typically drilled concrete piers. Holes for the foundation would be drilled using truck or track mounted augers. Reinforced-steel anchor bolt cages would be installed after excavation and prior to structure installation. These cages are designed to strengthen the structural integrity of the foundations, and would be assembled at the nearest Project laydown yard and delivered to the structure site via flatbed truck. These cages would be inserted in the holes prior to pouring concrete. The excavated holes containing the reinforced anchor bolt cages would be filled with concrete. Chute debris from concrete trucks would be washed into the excavated holes.

2.4.3.5 Pole Assembly and Erection

Wood poles and associated hardware would be delivered to each pole work area by truck. Insulator strings and stringing sheaves are then installed at each ground wire and conductor position while the pole is on the ground. Stringing sheaves are used to guide the conductor during the stringing process for attachment onto the insulator strings. The assembled structure would then be hoisted into place by a crane or line truck. Figure 2-5 illustrates typical pole assembly activities.

2.4.3.6 Conductor and Shield Wire Installation

Conductors and shield wire would be placed on the transmission line structures by a process called stringing. The first step to wire stringing is the installation of insulators (if not already installed on the structures during ground assembly) and stringing sheaves. Stringing sheaves are rollers that are temporarily attached to the lower portion of the insulators at each transmission line structure to allow conductors to be pulled along the line. Figure 2-5 illustrates the sequence of steps in installing conductors. Additionally, temporary clearance structures (also called guard structures) would be erected where required prior to stringing any transmission lines. The temporary clearance structures are typically vertical wood poles with cross arms and nets erected over highways, roads, power lines, structures and other obstacles to prevent ground wire, conductors, or equipment contact during stringing activities. Guard structures may not be required for small roads or may be accommodated by bucket trucks to provide temporary clearance. Bucket trucks are trucks fitted with a hinged arm ending in an enclosed platform called a bucket, which can be raised to let the worker in the bucket service portions of the transmission structure as well as the insulators and conductors without climbing the structure. Other safety measures such as barriers, flagmen, or other traffic control would be used.

Once the stringing sheaves and temporary clearance structures are in place, the initial stringing operation commences with the pulling of a lighter weight sock line through the sheaves along the same path the transmission line will follow. The sock line can be pulled in via helicopter or by ground based equipment. The sock line is attached to the hard line, which follows the sock line as it is pulled through the sheaves. The hard line is then attached to the conductor, shield wire or OPGW to pull them through the sheaves into their final location. Pulling the lines is accomplished by attaching them to a specialized wire stringing vehicle. Following the initial stringing operation, pulling and tensioning the line will be required to achieve the correct sagging or tension of the transmission lines between support structures.

Pulling and tensioning sites for 230 kV line construction would be required approximately every two miles along the ROW and would encompass approximately 1.1 acres each to accommodate required equipment. Equipment at sites required for pulling and tensioning activities would include tractors and trailers with spooled reels that hold the conductors, and trucks with the tensioning equipment. To the extent practicable, pulling and tensioning sites would be located within the ROW. Depending on topography, minor grading may be required at some sites to create level pads for equipment. Finally, the tension and sag of conductors and wires would be fine-tuned, stringing sheaves would be removed, and the conductors would be permanently attached to the insulators at the transmission structures.

At the tangent and small angle structures, the conductors will be attached to the insulators using clamps to “suspend” the conductors from the bottom of the insulators. At the larger angle dead-end structures, the conductors cannot be pulled through and so are cut and attached to the insulator assemblies at the structure “dead ending” the conductors.

2.4.3.7 Helicopter Use

Access is required to each transmission structure site for construction, and for operation and maintenance activities. Helicopters may be used to support these activities. Project construction activities potentially facilitated by helicopters may include delivery of construction laborers, equipment, and materials to structure sites; structure placement; hardware installation; and wire stringing operations. Helicopters may also be used to support the administration and management of the Project. Except in areas of extreme terrain where limits the construction of access roads as described in Section 2.4.3.2, the use of helicopter construction methods would not change the need for an access road system required for operating the Project because vehicle access is required to each structure site regardless of the construction method employed.

For all helicopter activities, the construction contractor would work with the Authorized Officer to ensure that the appropriate notifications are made to coordinate the air space with other possible aircraft and helicopters in the area being used for military training, fire support or other use.

2.4.3.8 Construction Yards/Staging Areas and Fly Yards

Several construction yards/staging areas, roughly five acres each would be required for materials and equipment storage and staging, and helicopter operations (fly yard) for construction activities. Possible locations would be identified during preliminary engineering design. All possible areas would be located on existing disturbed areas. The yards would serve as field offices, reporting locations for workers, parking space for vehicles and equipment and sites for temporary marshalling of construction materials.

2.4.3.9 Marking of Sensitive Areas

All sensitive areas, biological and cultural, would be marked on drawings and in the field prior to construction to ensure protection and avoidance of these areas. Marking in the field would consist of wooden stakes, which will be spray painted the same color (e.g., high visibility blue) for all sensitive areas. The stakes will represent general avoidance areas; no distinction between biological and cultural sites will be made. The marking would take place prior to construction. A preconstruction walk with the construction contractor would be conducted to identify avoidance areas in the field. After construction is complete in an area or no longer poses a concern to important biological and cultural resources, the stakes would promptly be removed to protect the sites location and significance from gaining unwanted attention.

2.4.3.10 Erosion and Sediment Control

Erosion and sediment control may be necessary to prevent soil erosion in construction areas located on hillsides where a leveled trail to access a structure location or a leveled area is required to allow equipment set-up for pole installation. Applying and maintaining standard erosion and sediment control methods would minimize erosion. These may include straw waddles, straw bale barriers and silt fencing which would be placed at construction boundaries. Gravel ramps may be installed at access points to public roadways, as needed, to prevent or minimize the tracking of mud, dirt, sediment or similar materials on to paved roadways.

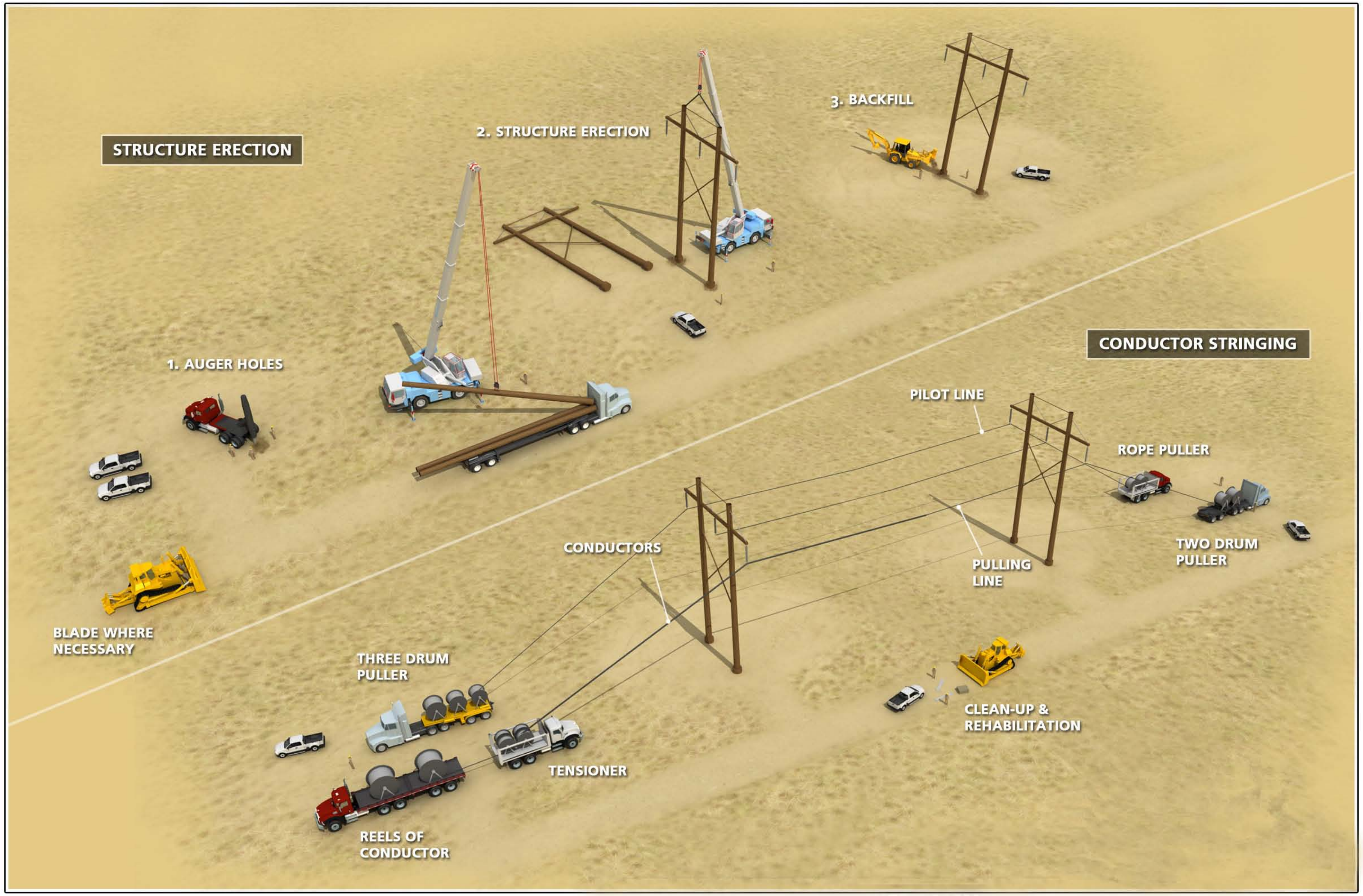
Erosion control structures such as waterbars, diversion channels, terraces and slope roughening may be constructed if determined to be necessary, to divert water and reduce soil erosion along the ROW, or other areas disturbed by construction where slopes exceed 30 percent. Selection of appropriate erosion control materials would be based on soil properties, steepness of slope and anticipated surface flow or runoff.

Existing vegetation would be preserved to the maximum extent practicable during all phases of construction. Vegetation clearing would be kept to a minimum and occur only where construction plans call for it.

All disturbed areas would be re-seeded using a native seed mixture as specified by the Authorized Officer and best management practices for erosion control. On slopes greater than 30 percent, additional measures such as organic fiber mulching, geo-textile fabrics and sod mats may be used.

Specific erosion and sediment control measures and locations would be specified in a Stormwater Pollution Prevention Plan (SWPPP).

FIGURE 2-5 TYPICAL STRUCTURE ASSEMBLY & WIRE INSTALLATION ACTIVITIES



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2.4.3.11 Disposal of Construction Debris and Site Clean-up

Construction sites, material storage yards, and access roads would be kept in an orderly condition throughout the construction period. Refuse and construction debris would be removed from the sites and disposed of in an approved manner. Oil, fuels and chemicals would not be dumped along the line. Oils, fuels and chemicals would be properly characterized per federal and state regulations and then transported to an approved site for disposal. No open burning of construction trash would occur. Construction practices would comply with all applicable federal, state, and local laws and regulations concerning the use, storage, transportation, and disposal of hazardous materials.

All forms of refuse and waste produced along the ROW during construction would be collected and disposed of in a designated landfill or appropriate waste disposal site. Refuse and waste is defined as any discarded material, trash, garbage, packing material, containers, waste petroleum products, broken equipment, used parts or excess construction materials.

2.4.3.12 Site Reclamation

The Contractor would restore all lands disturbed during construction including but not limited to: access roads, tensioning and pulling sites, structure sites, work areas, and staging areas. Every effort would be made to restore the disturbed areas to original contours and conditions, and to restore natural drainage within the ROW. Site reclamation would involve the personnel and equipment as shown in Table 2-9.

Sites would also be prepared for revegetation, including distribution of stockpiled soils and, where necessary, ripping or surface scarification. The Contractor would dispose of excess soils, rocks, and other materials that are unsuitable for site restoration as directed by the Authorized Officer. Prepared sites would be reseeded utilizing agency approved seed mixtures.

Any fences that were cut or otherwise modified during construction would be repaired and properly tensioned at the direction of private landowners and the Authorized Officer. Additionally, all gates or other features affected by construction activities would be repaired to their previous condition.

2.4.3.13 Fire Prevention and Suppression

All applicable fire laws and regulations would be observed during the construction period. All construction personnel would be advised of their responsibilities under the applicable fire laws and regulations, including taking practical measures to report and suppress fires. A Fire Protection and Control Plan would be developed.

Fire is a serious risk to construction personnel, materials and equipment that could result in the loss of equipment, lost time in construction activity, injury to personnel, even death. The proposed construction of the Project would require the use of equipment and materials that are flammable and combustible. The line would be constructed in various vegetation types, ranging from farmland to scrub-shrub, which could ignite from either natural or manmade causes. Construction would also take place near energized transmission lines, which if struck by equipment or personnel could result in fire.

All federal, state and county laws and ordinances, rules and regulations, which pertain to prevention, pre-suppression, and suppression of fires, would be strictly adhered to. This includes conformance with current Federal Wildland Fire Management Policy. All personnel will be advised of their responsibilities under applicable fire laws and regulations. It shall be the responsibility of the construction contractor to notify the appropriate federal, state or local fire agency when a Project related fire occurs within or adjacent to the construction area. The construction contractor would be equipped with approved fire suppression tools and equipment.

Pacific Power would coordinate with federal, state and local fire agencies at the onset on construction activities. The purpose of this coordination is to ensure that construction sites and personnel are equipped and trained to recognize and minimize fire hazards, to suppress a fire until firefighters can respond, and to locate pressurized and unpressurized water sources.

Since continued operation of the transmission line provides stability to the entire interconnected transmission system, the appropriate land management agency with fire protection responsibilities would make every effort to avoid using fire-suppression techniques that could take the line out of service. If the appropriate land management agency determines that it must use fire-suppression techniques that could affect operation of the line, it will notify the applicant as soon as possible.

If Pacific Power becomes aware of an emergency situation that was caused by a fire that could damage the transmission line or their operation, it would notify the appropriate agency contact. Likewise, if federal, state or local agencies become aware of an emergency situation that was caused by a fire on or threatening their respective lands and that could damage the transmission line or their operation, the affected agency would notify the appropriate Pacific Power contact.

The construction contractor would be responsible for any fire started, in or out of the Project area, by its employees or operations during construction. The construction contractor would be responsible for notifying emergency response officials and initial attempts at fire suppression. The construction contractor would take aggressive action to prevent and suppress fires on and adjacent to the Project area, and would rehabilitate burned areas as directed by the appropriate land management agency.

Specific construction-related activities and safety measures would be implemented during construction of the transmission line in order to prevent fires and to ensure quick response and suppression in the event a fire occurs.

Pacific Power would responsible for any fire started in the Project area during operation and maintenance of the line. Pacific Power would be responsible for notifying emergency response officials and initial attempts at fire suppression.

Also, all construction, operation and maintenance vehicles would carry fire suppression equipment including (but not limited to) shovels, buckets and fire extinguishers.

2.4.3.14 Transmission Line Construction Workforce and Equipment

Table 2-9 shows the approximate number of workers and types of equipment required to construct the Project. Various phases of construction may occur at different locations throughout the construction process, which would require several crews operating simultaneously at different locations. Construction of the Project would take approximately one year to complete.

TABLE 2-9 TRANSMISSION LINE CONSTRUCTION ESTIMATED PERSONNEL AND EQUIPMENT

ACTIVITY	PEOPLE	QUANTITY OF EQUIPMENT	
Survey	3	1	pickup trucks
Road Construction	3 to 4	2	bulldozers (D-8 Cat), 1 Excavator
		1	motor graders
		1	vibratory roller
		2	dump trucks
		2	equipment and materials trailers
		1	pickup trucks

ACTIVITY	PEOPLE	QUANTITY OF EQUIPMENT	
		1	water trucks (for construction and maintenance)
Direct embed pole holes and Footing Installation	6	1	hole digger
		as required	concrete trucks
		1	water truck
		2	pickup trucks
		1	line truck
Material Haul	4	1	tractor/trailer
		2	yard and field cranes or line trucks
		1	fork lift
Structure Assembly Per crew 2 crews required	4	1	pickup truck
		1	truck (2 ton)
Structure Erection Per crew 2 crews required	4	1	truck (2 ton)
		1	pickup trucks
		1	bucket truck
		1	crane
		1	line truck
Wire Installation	8	1	wire reel trailers
		1	diesel tractors
		1	cranes
		1	line trucks
		3	pickup trucks
		2	bucket trucks
		2	3-drum pullers
		1	single Drum Puller (large)
		1	double bull-wheel tensioner (heavy)
		1	static wire reel trailer OPGW
ROW Restoration and Cleanup	4	1	trucks
		1	motor grader
		1	seeding and planting equipment
		1	pickup trucks
		1	water trucks

Note: Maximum total personnel for all tasks is 45 persons (actual personnel at any one time would be less)

2.4.4 Operation and Maintenance

The design, construction, operation and maintenance of the Project would meet or exceed the requirements of the NESC, which governs the design and operation of high-voltage utility systems, U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) standards and Pacific Power's requirements for safety and protection of landowners and their property.

The transmission line would be protected with power circuit breakers and line relay protection equipment. If a conductor fails, power would typically be automatically removed from the line in less than 0.5 seconds. Lightning protection would be provided through overhead ground wires.

All buildings, fences and other structures with metal surfaces located within 200 feet from the centerline of the ROW would be grounded as necessary. Typically, buildings located 200 feet from the centerline would not require grounding. Other structures beyond 200 feet would be determined by the NESC to be grounded. All metal irrigation systems that parallel transmission lines for a distance of 1,000 feet or more and within 100 feet from the centerline would be grounded.

Operation and maintenance activities will include transmission line patrols, climbing inspections, structure and wire maintenance, insulator washing in selected areas as needed, and access road repairs. Necessary work areas around all structures would be kept clear of vegetation and the height of vegetation within the ROW would be limited. Periodic inspection and maintenance of each of the substations and communications facilities is also a key part of operating and maintaining the electrical system.

After the transmission line has been energized, land uses that are compatible with safety regulations would be permitted in and adjacent to the ROW. Existing land uses such as agriculture and grazing are generally permitted within the ROW. Incompatible land uses within the ROW include construction and maintenance of inhabited dwellings, and any use requiring changes in surface elevation that would affect electrical clearances of existing or planned facilities.

Land uses that comply with local regulations would be permitted adjacent to the ROW. Compatible uses of the ROW on public lands would have to be approved by the BLM or other applicable federal land management agency. Permission to use the ROW on private lands would be determined by Pacific Power in consultation with the landowner.

2.4.4.1 Transmission Line Maintenance

Regular ground and aerial inspections would be performed in accordance with Pacific Power's established policies and procedures for transmission line inspection and maintenance. Pacific Power's transmission lines and substations would be inspected for corrosion, equipment misalignment, loose fittings, vandalism, and other mechanical problems. The need for vegetation management would also be determined during inspection patrols.

Inspection of the entire transmission line would be conducted semi-annually. Aerial inspection would be conducted by helicopter semi-annually and would require two or three crewmembers, including the pilot. Detailed ground inspections would take place on an annual basis using 4x4 trucks or 4x4 all-terrain vehicles (ATVs). The inspector would assess the condition of the transmission line and hardware to determine if any components need to be repaired or replaced, or if other conditions exist that require maintenance or modification activities. The inspector would also note any unauthorized encroachments and trash dumping on the ROW that could constitute a safety hazard.

2.4.4.2 Hardware Maintenance and Repairs

Routine maintenance activities are ordinary maintenance tasks that have historically been performed and are regularly carried out on a routine basis. The work performed is typically repair or replacement of individual components (no new ground disturbance), performed by relatively small crews using a minimum of equipment, and usually are conducted within a period from a few hours up to a few days. Work requires access to the damaged portion of the line to allow for a safe and efficient repair of the facility. Equipment required for this work may include 4-wheel drive trucks, material (flatbed) trucks, bucket trucks (low reach), boom trucks (high reach), or man lifts. This work is scheduled and is typically required due to issues found during inspections. Typical items that may require periodic replacement include insulators, hardware or structure members. It is expected that these replacements would be required infrequently.

Pacific Power plans to conduct maintenance on the 230 kV transmission using live line maintenance techniques. Maintenance on the transmission lines can be completed safely using live line techniques thereby avoiding an outage to the critical transmission line infrastructure. For the 230 kV H-frame structures, this requires that adequate space be available at each structure site so that a bucket truck can be positioned to access the outside phases. To allow room at each structure for these activities in low slope areas, a pad area is required with the structure in the center of the ROW. The size and location of these required pads near the structures may vary depending on the side slope and access road routes at each site. The work areas and pads would be cleared to the extent needed to safely complete the work.

Wood poles are treated to retard rotting and structural degradation. Personnel access structures by pickup, ATV or by foot; inspect and test (including the subsurface) the poles; and then treat them by injecting preservatives into the poles. Wood pole inspections and treatments occur on a 10-year cycle.

2.4.4.3 Right-of-Way Repair

ROW repairs include grading or repair of existing maintenance access roads and work areas, and spot repair of sites subject to flooding or scouring. Required equipment may include a grader, backhoe, four-wheel drive pickup truck, and a cat-loader or bulldozer. The cat-loader has steel tracks whereas the grader, backhoe, and truck typically have rubber tires. Repairs to the ROW would be scheduled as a result of line inspections, or would occur in response to an emergency situation.

2.4.4.4 Vegetation Management

Work areas adjacent to electrical transmission structures and along the ROW must be maintained for vehicle and equipment access necessary for operations, maintenance, and repair, including for live-line maintenance activities. Shrubs and other obstructions would be regularly removed near structures to facilitate inspection and maintenance of equipment and to ensure system reliability. At a minimum, trees and brush would be cleared within a 25-foot radius of the base or foundation of all electrical transmission structures, and to accommodate equipment pads to conduct live line maintenance operations.

Vegetation within a linear area along the ROW under the conductors and extending 10 feet outside the outermost conductor would be maintained to consist of grasses and low growing shrubs or short trees under five feet tall at maturity. Every effort would be made to ensure that mature sagebrush is maintained intact as it typically does not exceed five feet in height. An area extending from 10 feet outside the outermost conductor to the edge of the ROW would be maintained to consist of tall shrubs or short trees up to 25 feet high at maturity.

When conductor ground clearance is greater than 50 feet, for example a canyon or ravine crossing with high ground clearance at mid-span, trees and shrubs would be left in place as long as the conductor clearance to the vegetation tops is 50 feet or more.

Noxious weed control will be described in detail in the POD's Noxious Weed and Invasive Plant Management Plan. This Plan will describe: the pre-construction inventory; prevention measures and treatment methods before and during construction; and monitoring and treatment measures that would be implemented following construction. If revegetation cannot be done immediately following construction, the appropriate interim noxious weed control measures discussed in the Noxious Weed and Invasive Plant Management Plan will be implemented until revegetation can occur.

2.4.4.5 Emergency Response

The operation of the transmission system is remotely managed and monitored from control rooms at PacifiCorp's operation center in Portland. Electrical outages or variations from normal operating protocols would be sensed and reported at the operation center. As well, the substations are equipped with remote monitoring, proximity alarms, and in some cases video surveillance.

The implementation of routine operation and maintenance activities on powerlines will minimize the need for most emergency repairs. Emergency maintenance activities are often those activities necessary to repair natural hazard, fire, or man-caused damages to a line. Such work is required to eliminate a safety hazard, prevent imminent damage to the powerline, or to restore service in the event of an outage. In the event of an emergency Pacific Power would respond as quickly as possible to restore power.

The necessary equipment for emergency repairs is similar to that necessary to conduct routine maintenance. However, on occasion, additional equipment may be required. For example, where the site of the outage is remote, helicopters may be used to respond quickly to emergencies.
In practice, as soon as an incident is detected, the control room dispatchers would notify the responsible operations staff in the area(s) affected and crews and equipment would be organized and dispatched to respond to the incident. Pacific Power would notify the appropriate agency contacts or private landowner regarding the emergency and required access to carry out the emergency repairs. Although restoration of the line would have priority, every effort would be made to protect crops, plants, wildlife and resources of importance.

2.5 PROJECT DESIGN FEATURES COMMON TO ACTION ALTERNATIVES

The Project design features and environmental protection measures described in this section have been incorporated into the Project design and would be implemented during construction and operation of the proposed Vantage to Pomona Heights 230 kV Transmission Line Project. The measures are designed to avoid or minimize environmental impacts from Project construction, operation and maintenance activities. These are items that Pacific Power has committed to implement as part of the Project development.

The Project design features were developed in an iterative process that involved conducting the impact analysis and then adding standard operating procedures, environmental protection measures and best management practices to the Proposed Action and alternatives as Project design features to address identified impacts.

The measures in this section will be reviewed, revised, and developed further, as appropriate, to reduce impacts associated with specific resource concerns (e.g., cultural, biological, visual resources, etc.), and will be included in the POD for this Project. The POD will be reviewed and approved by the federal land management agencies, and made a part of the authorizations to be issued for use of federal lands by the proposed Project.

2.5.1 General

GEN-1
All construction vehicle movement outside the ROW normally will be restricted to pre-designated access, contractor-acquired access, or public roads.

GEN-2
The spatial limits of construction activities will be predetermined, with activity restricted to and confined within those limits. No paint or permanent discoloring agents will be applied to rocks, vegetation, fences, structures, etc., to indicate survey or construction activity limits. The ROW boundary will be flagged in environmentally sensitive areas described in the POD to alert construction personnel that those areas are to be avoided.

GEN-3

In construction areas where re-contouring is not required, vegetation will be left in place wherever possible and original contour will be maintained to avoid excessive root damage and allow for re-sprouting. Disturbance will be limited to overland driving where feasible to minimize changes in the original contours.

GEN-4

To minimize ground disturbance, the alignment of any new access roads or cross country route will follow the landform contours in designated areas where practicable, provided that such alignment does not cause additional impacts to resource values.

GEN-5

In construction areas (e.g., marshalling yards, structure site work areas, spur roads from existing access roads) where ground disturbance is significant or where re-contouring is required, surface reclamation will occur as required by the landowner or land management agency. The method of reclamation will normally consist of, but is not limited to, returning disturbed areas back to their natural contour, reseeding, installing cross drains for erosion control, placing water bars in the road, and filling ditches.

All areas on BLM, JBLM YTC, and Reclamation lands that are disturbed as a part of the construction and/or maintenance of the proposed power line will be drill seeded where practicable with a seed mixture appropriate for those areas, unless an alternative method (e.g., broadcast seeding) is required due to slope or terrain. The BLM, JBLM YTC, and Reclamation will prescribe seed mixtures to fit each range site on their respective ownerships. Drill seeding will be done in late October or November to maximize the chance of success. The Agencies may recommend broadcast seeding as an alternative method in some cases. In these cases, seed will be applied at 1.5 to 2.0 times the drill seeding rate when broadcasted, and the seed will be promptly covered by methods such as harrowing, raking, or rolling with a culti-packer.

A Reclamation, Revegetation, and Monitoring Framework Plan identifying the reclamation stipulations will be developed and incorporated in the final POD, which will be approved by the BLM, JBLM YTC, and Reclamation prior to issuance of their respective authorizations.

GEN-6

A POD including specific plans to address mitigation requirements will be prepared in consultation with the Agencies prior to construction being authorized. These plans will detail additional measures required to minimize potential proposed Project impacts on natural resources and human safety. Plans typically include reclamation and re-vegetation of the ROW, resource protection, noxious weed control, dust control, hazardous spill prevention, fire prevention and storm water pollution prevention.

GEN-7

The POD will outline any required monitoring guidelines for the construction, operation, and maintenance of the line in order to avoid inadvertent impacts to resources. The Agencies will appoint an authorized inspector to oversee construction activities and inspect and determine if environmental protection is being done according to the approved POD. Alternately, a Compliance Inspection Contractor may be used to monitor construction activities on federal lands for this Project and ensure compliance with the POD. Pacific Power will conduct a training program to inform construction crews of all permit requirements and restrictions relevant to proposed Project construction.

GEN-8

Prior to construction, all supervisory construction personnel will be instructed on the protection of cultural, paleontological and ecological resources. To assist in this effort, the construction contract will address: (a) federal and state laws regarding antiquities, fossils, mineral materials, plants, and wildlife including collection and removal; (b) the importance of these resources and the purpose and necessity of protecting them.

GEN-9
All waste products and food garbage from construction sites will be deposited in covered waste receptacles, or removed daily. Garbage will be transported to a suitable disposal facility.

GEN-10
Within the limits of standard tower design and in conformance with engineering and Pacific Power requirements, structures will be placed as to avoid sensitive features, including but not limited to, wetlands, riparian areas, water courses, and cultural sites.

GEN-11
Construction holes left open overnight will be covered to prevent livestock or wildlife from falling in.

2.5.2 Biological Resources

BIO-1
Prior to construction, all supervisory construction personnel will be instructed on the protection of ecological resources. To assist in this effort, the construction contract will address: (a) federal and state laws regarding plants and wildlife; (b) the importance of these resources and the purpose and necessity of protecting them; and (c) methods for protecting sensitive resources.

BIO-2
Mitigation measures developed during the consultation period under Section 7 of the Endangered Species Act (1973) as amended will be adhered to as specified by the U.S. Fish and Wildlife Service (USFWS).

BIO-3
Special status species or other species of particular concern will be considered in accordance with management policies set forth by appropriate land management agencies (e.g., BLM, JBLM YTC, and Reclamation). This would entail conducting surveys for plant and wildlife species of concern along the proposed transmission line route and associated facilities (e.g., access and spur roads, staging areas) as agreed upon by the agencies. In cases where such species are identified, appropriate action will be taken to avoid adverse impacts on the species and their habitats. This may include altering the placement of roads or structures, where practical, as approved by the agencies.

BIO-4
Populations of plant species of concern will be delineated on Project maps as "Avoidance Areas," and will be marked in the field prior to the start of construction. Field marking will consist of wooden stakes, all spray painted the same color (e.g., high visibility blue) for all sensitive areas. Populations of plant species of concern will be staked with a 100 foot buffer around the edge of each population. Stakes shall be placed such that they can easily been seen from the adjacent stake. Staking of populations will be done by a qualified botanist during the time of year when the species of concern can be readily identified. After construction activities are complete or no longer pose a concern in a given area, the stakes will be promptly removed. In the event any special-status plants would require relocation, permission will be obtained from the Agencies.

If avoidance or relocation were not practical, the topsoil surrounding the plants will be salvaged, stored separately from subsoil and spread during the rehabilitation process. This will be done to preserve the seed bank and localized species habitat conditions. All borrow material and soil to be used for rehabilitation or any part of the Project will be weed free. Weed free borrow material will be obtained from sites inspected by a qualified botanist or environmental inspector knowledgeable about noxious weeds.

BIO-5
To eliminate the spread of noxious weeds and invasive species from Project activities, a Noxious Weed and Invasive Plant Management Plan will be developed and incorporated into the final POD. The plan will be developed in consultation with the Agencies and local weed control districts and will describe: the pre-construction inventory; prevention measures and treatment methods before and during construction; and monitoring and treatment measures that would be implemented following construction

BIO-6
Ground disturbance will be limited to that necessary to safely and efficiently install the proposed facilities and will be described in detail in the POD.

BIO-7
Pacific Power will prepare a revegetation plan in consultation with the Agencies. The plan will specify disturbance types and their appropriate revegetation techniques to be applied for proposed Project work areas, access roads and side cast materials. Techniques will be approved by the appropriate land management agency and would include reseeding with certified weed-free native or other acceptable species. The plan will include management and maintenance procedures approved by the appropriate land management agency for ongoing use of access roads and temporary work areas.

BIO-8
Wildlife and plant protection plans will be developed identifying specific measures to protect biological resources. Protection measure could include timing restrictions, ROW clearance surveys prior to construction and the use of biological monitors to protect biological resources during construction. In situations where impacts to sensitive plants cannot be avoided by construction activities, transplanting of plants will be considered. The criteria for transplanting will be included in the POD for the Project. The criteria will be formulated in coordination with the BLM, and in compliance with federal law, regulation, and policy regarding sensitive species.

If any new populations of plant species of concern are discovered on federal lands during Project surveys or construction, these findings will be reported within 48 hours to the authorized officer at the appropriate land management agency. Any newly discovered populations will be treated the same as currently known populations.

BIO-9
Use an Agency approved mixture of native and non-native species or seed for revegetation in areas where non-native species are already well established (i.e., disturbed grassland). Revegetation materials will meet the requirements of federal, state and county noxious weed control regulations and guidelines.

BIO-10
Comply with all federal noxious weed control regulations and guidelines, and comply with state and county noxious weed control regulations and guidelines.

BIO-11
Wash all equipment before entering the Project area and when leaving areas where noxious weeds are present.

BIO-12
Minimize the blading of native plant communities during construction, consistent with safe construction practices.

BIO-13
Restrict construction and maintenance activities during sensitive periods (breeding or nesting). Restricting these activities would eliminate the potential disturbance of wildlife during these critical periods of their life cycles.

- Avoid construction activities within 0.25 to 1.0 mile radius of an active raptor nest, if possible, unless specific features (e.g., terrain, barriers) dictate reduced buffers. Spatial buffers and seasonal restrictions would vary depending on the species (Romin and Muck 2002).
  - Bald eagle nest – 1.0 mile buffer from January through August.
  - Burrowing owl – 0.25 mile buffer from March through August.
  - Ferruginous hawk – 0.5 mile buffer from March through July.
  - Golden eagle – 0.5 mile buffer from January through August.
  - Osprey – 0.5 mile buffer from April through August.
  - Peregrine falcon – 1.0 mile buffer from February through August.
  - Prairie falcon – 0.25 mile buffer from April through August.

- Greater sage-grouse:
  - Avoid construction or maintenance activities within 0.6 mile of active leks from February to June (Stinson et al. 2004).
  - Minimize disturbance from construction and development activities, particularly within 0.6 mile of breeding habitat from February through June (Stinson et al. 2004).

BIO-14
New or improved access (e.g., blading, widening existing access) that is not required for maintenance will be closed or rehabilitated following construction. Closing access roads will protect the resources in that area from further disturbance by limiting new or improved accessibility by OHVs and other motorized vehicles.

BIO-15
If sensitive wildlife species are discovered during construction, operation, and maintenance activities within the ROW or work areas, a protective buffer zone will be established and the appropriate federal agency will be contacted immediately.

BIO-16
Speed limits for travel on newly constructed roads will be posted at 25 miles per hour (mph) in order to reduce the potential for wildlife collision. Overland travel areas will have speed limits of 15 mph.

BIO-17
The Project will be designed to conform to raptor-safe design standards, including *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (APLIC 2006), *Mitigating Bird Collisions with Power Lines: The State of the Art in 1994* (APLIC 1994) and PacifiCorp's *Bird Management Program Guidelines* (2006).

2.5.3 Land Use and Recreation

LU-1
Existing improvements will be repaired or replaced (if they are damaged or destroyed by construction activities) to their condition prior to disturbance as agreed to by the parties involved.

LU-2
Fences and gates will be replaced or repaired to their original condition as required by the landowner or the land management agency in the event that they are removed, damaged, or destroyed by construction activities. Fences would be braced before cutting. Temporary gates or enclosures will be installed only with the permission of the landowner or the land management agency and will be removed/reclaimed following construction. Temporary gates will be kept closed and locked, depending on agreement with the land management agency and private landowners.

LU-3
All existing roads will be left in a condition equal to or better than their condition prior to the construction of the transmission line.

LU-4
Consultation with the landowner or land management agency will be conducted to identify facility locations that create the least potential for impact to property and its uses.

LU-5
Construction staging areas and pulling sites will be located adjacent to existing roads where practical. Coordination with landowners will be conducted to establish construction areas (such as conductor pulling and splicing areas and construction yards).

LU-6
During Project construction, it may be necessary to remove livestock from areas where heavy equipment operations are taking place. Arrangements will be made with landowners and livestock owners to keep livestock out of these areas during those periods.

LU-7
To limit new or improved accessibility into the area by OHVs and other motorized vehicles, road access will be controlled in accordance with management directives of the Agencies and landowners.

LU-8
Necessary and/or appropriate ministerial (i.e., mandatory or prescribed) land use permits will be obtained.

LU-9
Construction will be timed, where practical, to minimize disruption of normal seasonal activities for cropland (planting and harvesting) and non-irrigated rangeland as well as avoiding peak use periods (i.e., weekends and holidays) at parks, recreation, and preservation areas. Construction activities will be coordinated with relevant agencies and/or landowners prior to construction.

LU-10
Advanced notice of construction activities will be given to landowners and residents potentially affected by construction activities. Adequate access to existing land uses will be provided during periods of construction and landowners notified of alternative access. Nighttime construction near noise-sensitive land uses (e.g., residences) will be avoided.

LU-11
Construction operations will avoid, to the extent feasible, the disturbance of agricultural soil during the wet season. The use of heavy equipment on agricultural land will be minimized to avoid soil compaction. Construction crews can reduce the amount of soil compaction by working when the ground is not wet, using equipment with more tires and wider tires to distribute the weight of the vehicle, and tilling the severely compacted areas after construction is completed, or using ground mats when the ground is wet.

LU-12
Obtain encroachment permits or similar legal agreements from appropriate authorities for each affected federal, state, and local roadways. Such permits are needed for roads that would be crossed by the transmission line, as well as for the parallel roads where transmission line construction activities would require the use of the public ROW (e.g., temporary lane closures).

LU-13
Coordinate in advance with emergency service providers to avoid restricting movements of emergency vehicles. Local agencies would then notify respective police, fire, ambulance and paramedic services. Notify local agencies of the proposed locations, nature, timing, and duration of any construction activities and advise of any access restrictions that could impact their effectiveness.

LU-14
Determine which aerial applicators operate in the Project area. Provide written notification to all aerial applicators stating when and where the new transmission lines and structures would be erected in order to educate pilots to presence of the transmission line. Provide all aerial applicators with aerial photographs or topographic maps clearly showing the transmission lines and structures in relation to agricultural lands.

LU-15
Provide a schedule of construction activities to all landowners who could be affected by construction.

LU-16
Compensate landowners for any new land rights required for ROW easements, or to construct new, temporary or permanent access roads.

LU-17
Plan and conduct construction activities to minimize temporary disturbance, displacement of crops, and interference with agricultural activities.

LU-18
Restore compacted cropland soils to pre-construction conditions.

LU-19
Compensate landowners for any damage to property including crops during construction and maintenance activities.

LU-20
Install marker balls on the conductor and lights on towers at the Columbia River crossing if required by the Federal Aviation Administration (FAA).

2.5.4 Transportation

TR-1
For safety at highway and road crossing, structures will be placed at the maximum feasible distance from the highway or road crossing within limits of standard structure design height.

TR-2
Prior to the start of construction, a traffic management plan will be submitted to the Washington State Department of Transportation (WSDOT) and applicable county public works departments. The plan will direct the contractor to implement procedures that will minimize traffic impacts. Routing of construction traffic will be coordinated with WSDOT and applicable county public works departments.

TR-3
Oversize or overweight vehicles will comply with applicable state and county requirements.

TR-4
When slow or oversized wide loads are in transit to and from work areas, advanced signs and traffic diversion equipment will be used to improve traffic safety. Pilot cars will be used as WSDOT dictates depending on load size and weight. Permits will be obtained for these oversized or overweight loads as required by WSDOT and applicable county public works departments.

TR-5
In consultation with WSDOT and the counties, detour plans and warning signs in advance of any traffic disturbances will be provided. Proper road signs and warnings will be used.

TR-6
Flaggers will be employed as necessary to direct traffic when large equipment is exiting or entering public roads to minimize the risk of accidents.

TR-7
Project personnel and contractors will be instructed and required to adhere to speed limits commensurate with road types, traffic volumes, vehicle types and site-specific conditions, to ensure safe and efficient traffic flow.

TR-8
Following construction, or during construction as necessary to maintain safe driving conditions, any damage to existing roadways caused by construction vehicles will be repaired. Repairs will be coordinated as appropriate with WSDOT and/or the counties.

2.5.5 Visual Resources

VIS-1
No paint or permanent discoloring agents will be applied to rocks or vegetation to indicate limits of survey or construction activity.

VIS-2
At residences, the ROW will be aligned, to the extent practicable, to reduce impact on the residences and inhabitants.

VIS-3
Locate construction staging areas away from visually sensitive locations. The contractor hired to construct the transmission line will be responsible for determining appropriate staging locations.

VIS-4
Locate new access roads within previously disturbed areas wherever possible.

VIS-5
Require that contractors maintain a clean construction site and all related equipment, materials, and litter be removed following completion of construction.

VIS-6
To reduce visual contrasts caused by glare created by standard aluminum conductors (wires), non-specular conductors will be used.

2.5.6 Cultural Resources

CUL-1
Pacific Power will implement stipulations of a Memorandum of Agreement (MOA) or Programmatic Agreement (PA) prepared and signed by the BLM, Army, Reclamation, other federal agencies, Washington State Historic Preservation Officer, and other parties according to the requirements of Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 C.F.R. 800. The MOA or PA will define the Area of Potential Effects (APE); procedures for identifying cultural resources within the APE; evaluating their significance; assessing effects; avoiding or mitigating adverse effects; emergency discoveries; reporting; Native American consultation; and other topics.

CUL-2
Pacific Power will oversee an intensive pedestrian cultural resource survey on all federal and state lands and on private lands where permission of the land owner has been granted prior to survey. Survey will be conducted within all areas of possible physical disturbance within the APE of the selected alternative following BLM manual guidelines. The APE for the undertaking includes all involved federal, state, and private lands and is defined as follows:

- The transmission line APE shall be the width of the ROW along the centerline.
- The APE for any existing unpaved access roads/existing roads which may require improvement and new roads shall be a 100-foot-wide corridor, 50 feet on both sides of the proposed road centerline, plus a turning radius of 60 feet where needed. In steeper terrain the 100-foot-wide corridor may be wider to allow for cut and fill activities.
- The APE for staging areas, lay-down areas, pulling and tensioning areas, and any other temporary use areas shall be the footprint of such areas plus a 200 foot buffer extending in all directions.
- The APE for geotechnical drilling will include the boring location and a 100-foot radial buffer plus new or improved access roads to the drill site.
- The APE for assessing visual effects on cultural resources will be land within a specific distance of the transmission line as determined by the BLM.

CUL-3
In consultation with appropriate land managing agencies and the State Historic Preservation Officer, specific mitigation measures will be developed and implemented to mitigate any adverse effects. These may include Project modifications to avoid adverse impacts, monitoring of construction activities and data recovery studies.

CUL-4
Prior to construction, all supervisory construction personnel will be instructed on the protection of cultural resources. To assist in this effort, the construction contract will address: (a) federal and state laws

regarding antiquities, including collection and removal; (b) the importance of these resources and the purpose and necessity of protecting them; and (c) Tribal concerns and (d) methods for protecting sensitive resources.

CUL-5
In the event that unknown cultural resources are discovered during construction activities of the Project, or should those activities directly or indirectly impact known resources in an unanticipated manner, the following actions, at a minimum will be initiated by Pacific Power or the agency having jurisdiction over the land involved, or a representative duly authorized to perform these tasks:

- All activities will halt in the immediate vicinity of the discovery and all actions that might adversely affect the property would be redirected to an area at least 200 feet from the point of discovery.
- Pacific Power and the authorized officer at the land management agency having jurisdiction over the land involved would be notified immediately by phone and written confirmation of the discovery. If there is a cultural resource monitor at that location or in the general area, that person will be called in to assess the discovery which may include the nature of the resource (types and kinds of artifacts and features), the spatial extent of the resource, and the nature of the deposition or exposure.
- In the event a cultural resource specialist or other necessary persons are not immediately available, Pacific Power and/or the agency having jurisdiction may be required to cover or otherwise protect the discovery until such a time that the appropriate parties can be present for inspection and evaluation.
- The cultural resource specialist will complete the appropriate inventory form and send it to appropriate parties for review and comment.
- The site will be evaluated in terms of the criteria of eligibility for the National Register established under 36 C.F.R. 60.4.
- If the site is determined to be damaged, a damage assessment will be conducted by an approved cultural resource specialist.
- Pacific Power will consult with BLM, or other appropriate federal land managing agencies, the Tribes, and when State or private land is involved, the Washington State Historic Preservation Officer to determine if and when construction activities in the location of the discovery may resume.
- If human remains are found on private or State land Pacific Power will implement notification procedures as required by State law. If human remains are found on Federal land, Pacific Power will abide by the requirements of the Native American Graves Protection and Repatriation Act (NAGPRA) and other appropriate laws and regulations.

CUL-6
The BLM may require a cultural resource monitor be present during construction in areas the BLM or other land management agency determines to be culturally sensitive.

CUL-7
Sensitive areas will be delineated on Project maps as avoidance areas. The maps will also show established work areas and areas where overland travel or other disturbance is to be avoided. Maps will be provided to construction personnel. The avoidance areas will be marked in the field prior to construction.

Field marking will consist of wooden stakes all spray painted the same color (e.g., high visibility blue) for all sensitive areas. After construction activities are complete or no longer pose a concern in a given area, the stakes will be promptly removed.

Construction crews and vehicles will use established roads and approved routes for travel. Cross country travel will not be allowed in sensitive areas or locations. If roads or designated routes cross through sensitive areas that may be affected by off-road travel, signs indicating off-road travel is not allowed will be installed during construction activities. The signs will be promptly removed following completion of work in a particular area to protect sensitive values and unwanted attention.

2.5.7 Wildland Fire

WF-1
Initiate discussions with local fire districts and regional fire prevention staff prior to construction to provide transmission line safety training, including safety procedures when conducting fire suppression near a power line.

WF-2
Fuel all highway-authorized vehicles off-site to minimize the risk of fire. Fueling of construction equipment that is transported to the site via truck and is not highway authorized will be done in accordance with regulated construction practices, and state and local laws. Helicopters will be fueled and housed at local airfields or at staging areas.

WF-3
Carry fire suppression equipment including (but not limited to) shovels, buckets, and fire extinguishers on all construction, operation and maintenance vehicles.

WF-4
A fire prevention plan will be developed and incorporated into the POD. Pacific Power or its contractors will notify the federal agencies of any fires, and comply with all rules and regulations administered by the federal land management agencies concerning the use, prevention, and suppression of fires on federal lands, including any fire prevention orders that may be in effect at the time of the permitted activity. Pacific Power or its contractors may be held liable for the cost of fire suppression, stabilization, and rehabilitation. In the event of a fire, personal safety will be the first priority of Pacific Power or its contractors

2.5.8 Climate and Air Quality

AQ-1
Road construction will include dust control measures, as required and identified in the approved POD.

AQ-2
All requirements of those entities having jurisdiction over air quality matters will be adhered to. Any necessary dust control plans would be developed and permits for construction activities will be obtained. Open burning of construction trash will not be allowed.

AQ-3
Use water trucks to control dust during construction operations when necessary.

AQ-4
Cover construction materials if they are a source of blowing dust.

AQ-5
Limit the amount of exposed soil, including dirt piles and open pits, to a minimum.

AQ-6
All vehicle engines are to be in good operating condition to minimize exhaust emissions.

AQ-7
Submit the Dust Control Plan, included as part of the POD, to the Yakima Regional Clean Air Agency prior to construction.

AQ-8
Prevent wind erosion by reseeding with an appropriate seed mixture as soon as reasonably possible following construction activities.

AQ-9
Construction vehicles are to travel at low speeds on unpaved roads and at construction sites to minimize dust.

2.5.9 Soils, Geology and Water Resources

SGW-1
Roads will be built at right angles to streams to the extent practicable. Existing public roads will be utilized to the extent possible. Appropriately sized culverts will be installed where needed. All construction and maintenance activities will be conducted in a manner that would minimize disturbance to vegetation, drainage channels and stream banks. In addition, road construction will include dust-control measures during construction in sensitive areas, as required. All existing roads will be left in a condition equal to or better than their condition prior to the construction of the transmission line.

SGW-2
Disturbed areas around structures, at pulling and tensioning sites, and on the edges of roadways will be rehabilitated following construction (as specified by the Agencies and the Authorized Officer).

SGW-3
A pre-construction field verification of landslide prone areas will be made. Design changes to roads may be needed based on the field verification.

SGW-4
A geotechnical engineering report will be prepared prior to construction that appropriately addresses risks to structures and roads due to geological hazards.

SGW-5
Mark construction limits within agricultural fields or grasslands to minimize disturbance.

SGW-6
Inspect and maintain tanks and equipment containing oil, fuel, or chemicals for drips or leaks and to prevent spills onto the ground or into state waters or waters of the United States.

SGW-7
Maintain and repair all equipment and vehicles on impervious surfaces away from all sources of surface water.

SGW-8
Vehicle and equipment refueling and the storage of potentially hazardous materials will not occur within a 100-foot radius of a waterbody; a 200-foot radius of all identified private water wells; and a 400-foot radius of all identified municipal or community water supply wells. For route segments on JBLM YTC, refueling will not occur within 656-feet of any drainage (wet or dry), and parking or staging of vehicles will be at least 328-feet from drainages. Spill preventative and containment measures or practices will be incorporated as needed.

SGW-9
Provide spill prevention kits at designated locations on the Project site and at the hazardous material storage areas.

SGW-10
Stabilize cut and fill slopes.

SGW-11
Minimize erosion by applying and maintaining standard erosion and sediment control methods. These may include using certified weed-free straw waddles and bale barriers and silt fencing which would be placed at construction boundaries and where soil would be disturbed near a wetland or waterbody. Specific erosion and sediment control measures and locations will be specified in a SWPPP as part of the POD.

SGW-12
Construction operations will avoid, to the extent feasible, the disturbance of soil during the wet season. Construction crews can reduce the amount of soil compaction by working when the ground is not wet, using equipment with more tires and wider tires to distribute the weight of the vehicle, and tilling the severely compacted areas after construction is completed, or using ground mats when the ground is wet.

2.5.10 Public Health and Safety

PHS-1
Pacific Power will respond to complaints of radio or television interference generated by the transmission line by investigating the complaints and implementing appropriate mitigation measures. The transmission line will be patrolled on a regular basis so that damaged insulators or other transmission line equipment that could cause interference, are repaired or replaced.

PHS-2
Mitigation will be applied as needed to eliminate induced currents and voltages onto conductive objects (should they occur) sharing a ROW to the mutual satisfaction of the parties involved.

PHS-3
Hazardous materials will not be drained onto the ground or into streams or drainage areas. All construction waste including trash and litter, garbage, other solid waste, petroleum products and other potentially hazardous materials will be removed to a disposal facility authorized to accept such materials.

PHS-4
Appropriate safety guidelines will be followed as required by state and federal regulations (29 C.F.R. 1910.109) relating to blasting operations, should blasting be necessary.

PHS-5
Appropriate traffic control measures will be utilized to ensure public safety during construction. Prior notice would occur for any extended delays or road blockage.

PHS-6
Towers and/or ground wire will be marked with highly visible devices where required by governmental agencies (e.g., FAA).

PHS-7
Limit construction activities to daytime hours.

PHS-8
During final design, limit the conductor surface gradient in to meet the Institute of Electrical and Electronics Engineers (IEEE) Radio Noise Guideline.

PHS-9
During construction, identify objects such as fences, metal building, pipelines and other metal objects within or near the ROW that have the possibility for induced potentials and currents and implement electrical grounding of these objects according to Pacific Power and NESC standards.

PHS-10
During final design and construction, identify areas where large equipment is anticipated and provide sufficient conductor clearance to ground to meet the NESC five milliampere (mA) rule or limit the size or access of large equipment.

PHS-11
Pacific Power will identify and provide a public liaison person before and during construction to respond to concerns of neighboring receptors, including residents, about noise construction disturbance.

PHS-12
Pacific Power will establish a toll-free telephone number for receiving questions or complaints during construction and develop procedures for responding to callers.

2.6 ALTERNATIVES CONSIDERED BUT ELIMINATED

The agencies considered several alternatives to the proposed Project. Some alternatives were eliminated from further consideration because they, were technically or economically infeasible, would violate reliability criteria and standards, or because their implementation was determined by the agencies to be remote or speculative.

2.6.1 Alternative Transmission Projects

2.6.1.1 Double Circuit Existing Pomona-Wanapum 230 kV Transmission Line

This option was considered to determine whether it would be feasible to replace the existing Pomona-Wanapum single circuit 230 kV transmission line with a new double circuit transmission line on a single set of structures in the existing ROW, thereby constructing the needed line without having to increase the ROW size and creating new impacts to the surrounding environment. This alternative was determined to be infeasible and was eliminated from further consideration because it would violate mandatory North American Electric Reliability Corporation (NERC) and WECC standards of reliability and approved criteria for line separation as discussed below.

The last transmission line built by Pacific Power to serve the electrical loads in the Yakima valley was the Pomona-Wanapum 230 kV transmission line which was constructed in the mid-1970s. Since that time, energy demand in the Yakima Valley has continued to grow. Pacific Power planning studies have identified the loss of the existing Pomona-Wanapum 230 kV transmission line as the single most critical outage condition on the Mid-Columbia system.

Transmission systems in the United States must be planned, operated, and maintained so that they meet the NERC reliability standards. Additionally, transmission systems in the western United States must also meet the reliability standards of the WECC. Pacific Power's existing transmission system in the Yakima Area no longer meets these reliability standards due to load growth in the Yakima area.

PacifiCorp (Pacific Power) participated in a regional transmission system planning study (NTAC 2007) to address reliability issues within the Mid-Columbia transmission system. To address these problems the Mid-Columbia utilities including BPA, Grant County PUD, Chelan County PUD, PacifiCorp, and Puget Sound Energy worked together with the NWPP, NTAC to study the Mid-Columbia transmission system and define needed reinforcements. The Wanapum/Vantage-Midway Area 230 kV study was completed in November 2007.

The study determined that loss of the existing Pomona-Wanapum 230 kV transmission line would result in a significant load shedding exposure on the transmission system, and would also impact other transmission providers in the Mid-Columbia area with overloads of existing transmission components. Based on 2007 loads and system activity during high load periods in the Yakima Valley, loss of the Pomona-Wanapum 230 kV transmission line would result in the need to shed up to 167 megawatts. This load shed would occur through five different substations and would represent 33 percent of the 500 megawatts (MW) load in the Yakima area. Load shedding means that power would not be able to be delivered and available to the Yakima area because power delivery would have to be curtailed to prevent the overload and failure of parallel transmission systems serving the Yakima area as explained below.

The regional transmission study showed an outage of the Pomona-Wanapum 230 kV transmission line would result in redistribution of electrical flow across the BPA and Grant County PUD parallel transmission systems that also feed into Pacific Power’s Yakima load area. This redistribution then results in loadings well above the acceptable limits of many existing transmission components on the other systems putting the regional transmission system at risk of failure. The transmission system planning studies determined that an outage of the Pomona-Wanapum 230 kV transmission line would result in the overload of three Pacific Power high voltage transmission lines and two BPA high voltage transmission lines, potentially causing service interruptions in the Yakima Valley. The regional planning study showed that the addition of the new Vantage to Pomona Heights transmission line would eliminate the redistributed loads and the overloading of the adjacent transmission system.

The planned line would mitigate the risk and ensure reliable, efficient service. However, there are NERC/WECC requirements in regards to minimum transmission line separation for lines in a common corridor. In order to meet these requirements the new transmission line would have to be separated from the existing Wanapum to Pomona Heights 230 kV transmission line by at least “the longest span length of the two transmission circuits at the point of separation or 500 feet, whichever is greater.” If the separation criteria are not met, then the Pacific Power transmission system would not meet the NERC/WECC reliability criteria in the Yakima area.

The separation requirement is derived from both the NERC and WECC System Performance standards. The NERC criteria TPL-003-0, effective April 2005, states that the network must be able to supply demand under contingency conditions as defined in Category C.5, which includes clearing of "any two circuits of a multiple circuit towerline." The WECC standard goes further by stating that Adjacent

Transmission Circuits on separate towers must meet the NERC Category C.5 criteria. Adjacent Transmission Circuits are defined by WECC as transmission circuits within a Common Corridor with no other transmission circuits between them. A Common Corridor is defined by contiguous or parallel ROWs "with structural centerline separation less than the longest span length of the two transmission circuits at the point of separation or 500 feet, which is greater." This regional WECC criteria has been approved by NERC.

Placing the existing Pomona-Wanapum transmission line and the proposed Vantage-Pomona transmission line on the same set of poles would violate NERC and WECC reliability criteria and would not provide the needed reliability of a physically separate line. As a matter of practice, construction on separate ROWs is necessary when a multi-circuit outage on a common corridor must be considered a credible event.

This alternative was eliminated from further consideration because it would violate mandatory NERC and WECC reliability criteria.

2.6.1.2 New Vantage-Midway 230 kV Transmission Line

PacifiCorp (Pacific Power) participated in a regional transmission system planning study to address reliability issues within the Mid-Columbia transmission system. To address these problems the Mid-Columbia utilities including BPA, Grant County PUD, Chelan County PUD, PacifiCorp, and Puget Sound Energy worked together with NWPP, NTAC to study the Mid-Columbia transmission system and define needed reinforcements. The Wanapum/Vantage-Midway Area 230 kV study was completed in November 2007.

The Lower-Mid-Columbia 230 transmission system delivers power to the lower voltage load area systems and transfers surplus power out of the Mid-Columbia area. The major load areas receiving power from the system include: Yakima County, Grant County, and Benton County (Tri-Cities area). The 230 kV transmission system is exposed to thermal violations during the summer ambient temperatures and peak conditions. Additionally, there is exposure to voltage collapse for bus contingencies at the Wanapum/Vantage substation.

The objective of the regional transmission system planning study was to determine the best reinforcements to mitigate the thermal violations and exposure to voltage collapse identified on the Lower-Mid-Columbia 230 kV system. The study focused on the Wanapum/Vantage to Midway transmission. Power flow studies were used to analyze the system for three reinforcement plans. The performance of each plan was compared to identify the plan that provides the most benefit. Benefit was measured in terms of system loading relief and mitigation of thermal violations.

Three major reinforcement options were studied and compared:

1. A new Vantage-Pomona 230 kV line (proposed Project)
2. A new Vantage-Midway 230 kV line
3. Tying the Wanapum-Walla Walla, Midway-Potholes-Coulee, and Midway-Rocky Ford-Coulee 230 kV lines together at their crossing about 12.6 miles east of Wanapum substation along the Walla Walla line to create a new 230 kV path between Wanapum/Vantage and Midway (an alternative to building an new Vantage-Midway line).

The study concluded that even with a new Vantage-Midway 230 kV line the existing Wanapum-Pomona 230 kV line would still overload for N-1 Union Gap-Midway and N-2 Midway Bus 3 contingencies in the

2012 case. In the 2017 case, the Wanapum Bus contingency would produce a reactive shortage and voltage collapse without a new Vantage-Pomona 230 kV line.

The study determined that building a new Vantage-Pomona 230 kV line provided the most benefit to the system and outperformed building a new Vantage-Midway 230 kV line (Option 2) or tying the Wanapum-Walla Walla, Midway-Potholes-Coulee, and Midway-Rocky Ford-Coulee 230 kV lines together at their crossing about 12.6 miles east of Wanapum substation along the Walla Walla line to create a new 230 kV path between Wanapum/Vantage and Midway (Option 3).

Additionally, the study concluded that a new Vantage-Pomona 230 kV line would still be required even if a new Vantage-Midway 230 kV line was constructed.

Based on the findings of the Northwest Transmission Assessment Committee, Mid-Columbia Transmission Study Group, the alternative of building a new Vantage-Midway 230 kV Transmission Line was eliminated from further study because the system studies did not show that it would provide the required system loading relief and therefore would be ineffective.

2.6.2 Underground Construction

2.6.2.1 Introduction

Several comments were received from the public during scoping requesting consideration of installing the transmission line underground. In addition, a letter from the Army Installation Management Command, JBLM YTC outlined concerns that some of the overhead transmission alternatives on JBLM YTC would have the potential to create significant aviation issues. The alternatives were located in the northern portion of JBLM YTC and within the southern boundary of JBLM YTC. The letter stipulated that, in order to cross JBLM YTC, all or portions of the new (and the existing Pomona-Wanapum) transmission line would have to be placed underground to mitigate safety risks. The following discussion addresses underground technologies, construction practices, maintenance requirements, reliability issues, cost and environmental impacts that when considered collectively, make undergrounding extra high voltage (EHV) transmission lines impractical except for short distances in congested metropolitan and suburban areas.

High voltage underground 230 kV and some 345 kV is now being used in large North American metropolitan areas like San Francisco, New York, and Vancouver BC where the lines are placed in large tunnels underneath the streets of these highly congested cities that have no space available for overhead lines. Because underground lines are less reliable than overhead lines, multiple parallel lines are often needed so that electric service to a particular area is not disturbed when a problem or outage occurs with one of the lines.

High voltage underground transmission lines have markedly different technological requirements than lower voltage underground distribution lines. Underground high voltage transmission lines require extensive cooling systems to dissipate the heat generated by the transmission of bulk electricity. The extremely high cost of large cooling systems and other special design requirements prohibits the application of underground transmission systems for long distance electric transmission. Overhead conductors are cooled by the open air surrounding them. Placing the conductors on towers puts these conduits of energy above most human activity on the ground in a transmission corridor and deals effectively with the issue of heat.

2.6.2.2 Cost

One major reason that utilities do not normally install EHV transmission lines underground is that the construction costs of an underground a high voltage transmission line are many times more expensive than the cost of overhead construction. Depending on topography, costs for an underground lower voltage (69 kV to 138 kV) cable construction typically range from four to six times greater than construction of overhead lines. Costs of installed 230 kV underground cable systems are in the range of 10 to 20 times as much as overhead 230 kV (National Grid 2009).

2.6.2.3 Reliability

While underground transmission lines are relatively immune to weather conditions, they are vulnerable to washouts, seismic events, cooling system failures, and inadvertent excavation. Other possible causes for cable failure include water intrusion into the cable, overheating of the cable, high voltage transients, thermal movement during load cycling, and aging of the cable. The repair of high-voltage underground cable systems has relatively long outage times compared to repairs of traditional overhead lines. When a fault occurs, the circuit is out of service and cannot be placed back into service until repair and a test of the system is completed. Because the cable contains a central hollow duct in the conductor that carries cooling dielectric fluid, outage levels can be lengthy until fluid levels are restored. Qualified cable-splicing personnel may be difficult to retain on short notice. It could take five to 10 days to mobilize qualified technicians and equipment to splice a failed cable. The estimated minimum outage duration for locating, excavating and repairing a single cable failure is estimated to be at least 20 days. Typically, failures in overhead lines can be located and repaired in a matter of hours. Long-term outages would be unacceptable for a circuit carrying bulk power. An underground conductor may last only 20 years, whereas an overhead line can last as long as 100 years.

2.6.2.4 Reactive Power Compensation

The characteristics of the underground cable insulating material and the close proximity of the cables to one another results in the cable system introduce high reactive loads onto the electrical system. These reactive loads would have to be offset with compensation at above ground compensation stations located every seven to 20 miles along the transmission line route. A further consideration is that the electrical system as a whole may or may not be capable of reliably accommodating these very significant reactive power loads, making the integration of long underground AC power lines into the overall power grid questionable or infeasible.

2.6.2.5 Environmental

The environmental impacts of constructing an underground transmission line would be similar to those for major pipeline construction. Typical construction would involve extensive ground disturbance; requiring a continuous trench between terminal points. Potentially greater adverse environmental impacts could be expected because the majority of the ROW would be disturbed. Whereas, overhead transmission line construction typically would result only in disturbances at individual structure sites, and at the ancillary facilities associated with access to the ROW. In addition, overhead construction has the flexibility to span sensitive land use features, and land uses both during construction and afterwards. Underground construction does not have this type of flexibility and would require construction through sensitive features. In agricultural areas, underground construction may be much more disruptive to agricultural or rural land uses than overhead construction. Farming can usually be conducted under overhead lines (with the exception of structure locations), while it would be prohibited over underground lines to provide continual access to the underground cable and to avoid damaging the line during cultivation. Underground transmission ROWs require restrictive development and land use easements that prohibit many forms of economical land use (EPRI 2008).

2.6.2.6 Underground Cable Technologies

There are four basic underground cable technologies for underground circuits:

- Solid Dielectric (cross-linked polyethylene or XLPE)
- Gas Insulated Transmission Line (GIL)
- Pipe-type (fluid filled or HPFF)
- Self-Contained Fluid Filled (SCFF)

Solid Dielectric Cable

The components of a typical solid dielectric cable consists of a stranded copper or aluminum conductor, semi-conducting extruded conductor shield, extruded dielectric insulation, extruded semiconducting insulation shield, a lead, aluminum, copper or stainless steel sheath moisture barrier, and a protective jacket. A metallic shield, tape or drainwire, is required to carry fault current when a sheath is not used. Newer cable technology uses a high voltage extruded dielectric insulation of XLPE. Applications of XPLE are limited to short transmission lines. Generally solid dielectric technologies are used for lower voltage underground transmission that carries less current (EPRI 2008; National Grid 2009).

Gas Insulated Transmission Line

GIL technology at 230 kV and higher voltage levels has been implemented primarily within substations and not for longer transmission lines. GIL has been incorporated into substation designs with the length typically limited to distances less than 1,000 feet. The high cost and lack of experience with respect to longer underground transmission lines, and questions of reliability are more of a concern that other more prominent cable technologies (National Grid 2009).

High Pressure Fluid Filled Cable

HPFF cable systems are a pipe-type system where three single phase cables are located within a single steel pipe. HPFF cables use Kraft paper insulation or a laminated polypropylene paper (LPP) insulation that is impregnated with dielectric fluid to minimize the insulation breakdown under electrical stress. Since the system requires a continuous high pressure, pumping plants are required every seven to 10 miles along the route, assuming a relatively flat topography. The pumping plants are responsible for maintaining a constant pressure on the system, but must have large reserve tanks to facilitate the expansion and contraction of the dielectric fluid as the system undergoes thermal cycling. To maintain an operable pipe-type system, cathodic protection must be applied to the cable pipes to mitigate corrosion. This in turn helps prevent fluid leaks which pose both an operational and an environmental concern. If a loss of coolant fluids were to occur it would result in environmentally hazardous coolant materials contaminating the surrounding soil. A coolant fluid leak can be caused by several means including thermal expansion and contraction of the cable due to power cycling, ground movement, splice breakage, termination movement, improper installation and a cable fault. The fluid is under pressure, so if a leak occurs, it can spread. Using an HPFF system does provide high reliability, but requires additional equipment, resulting in additional opportunity for component failure, while specially trained personnel are required to maintain these systems.

Self Contained Fluid Filled Cable

SCFF cable systems are very similar to the HPFF systems. The cable is typically constructed around a hollow tube, used for fluid circulation, and uses the same Kraft paper or LPP insulation materials. Because the fluid system is “self-contained” the volume of fluid required is significantly less, however, the same distribution of pumping plants would be required. While SCFF cable systems have the longest running history at the EHV levels, their use is typically limited to long submarine cable installations

Superconducting Cables

Research is currently underway in the advancement of high temperature superconductors (HTS). Utilizing a unique cable design where all three phases are centered concentrically on a single core, the cables are capable of displaying low electric losses with the same power transfer capabilities as compared with a standard non-superconducting cable. The core, filled with a cryogenic fluid, super cools the conducting material resulting in extremely low losses and high electrical power transfer capacities. Most HTS systems are located adjacent to large metro areas, where they are capable of transferring large quantities of power a few thousand feet, at the distribution level. However, technological advances in the last few years have seen the first 138 kV system installed in Long Island, New York in early 2008. Because HTS systems have not been established at the 230 kV or 500 kV voltage levels, superconducting cable would not be a technology option.

2.6.2.7 Reliability and Maintenance

Basic maintenance of the above cable systems consists of a thorough yearly inspection, while any fluid systems must be inspected and tested monthly. Inspections include all terminations and splices, all bonding systems, as well as all values, gauges, switches, and alarms within the pumping plant. Cathodic protection systems are monitored as an on-going process.

Long-term reliability of underground cable systems is a major concern. A catastrophic failure of any portion of the system (cable, splices, terminations, or fluid systems) could result in the cable system being inoperable and out of service for extended periods of time. While overhead lines can be quickly visually inspected for damage, underground lines must be tested with specialized equipment to locate the damaged cable or system components. Upon locating the failure, highly trained workmen must be mobilized to repair or replace the faulty equipment or cable, resulting in outages lasting several weeks to months. The forced outage, as well as the extensive repair time, may result in increased stress to the remaining electrical grid.

2.6.2.8 Conclusion

Underground cable system installation has historically been justifiable in terms of cost and reliability only in urban or metropolitan areas, and for limited distances. Because of the high cost of an underground line as compared to overhead 230 kV line, reliability and reactive compensation issues for long installations, increased land disturbance, and the impracticality of construction on mountainous terrain the alternative of undergrounding was not considered technically or economically feasible for the Project.

The reduction of visual impacts of underground versus overhead transmission does not outweigh the economic, technical and constructability challenges, reduced reliability and additional land disturbance and environmental impact associated with underground construction. Underground construction of the transmission line is not considered a viable alternative in any instance, and was eliminated from further consideration.

2.6.3 Non-Transmission Alternatives

2.6.3.1 Distributed Generation

Distributed generation is placement of small generators within load pockets in urban areas. Distributed generation is typically less than 5.0 MW in net generating capacity that is located on distribution feeders near customer load. Examples of distributed generation include fuel cells, micro turbines, photovoltaics, wind, landfill gas, and digester gas. Distributive generation is implemented, where feasible, in major population centers. Distributed generation is not a practical or reasonable alternative to the proposed Project because this alternative alone would not address the overloading and reliability issues that would occur with an outage of the existing Pomona-Wanapum 230 kV transmission line and would not address the need to provide another transmission path that could serve the over 500 MW load in the Yakima area which the proposed Project is intended to provide. This alternative was eliminated from further consideration.

2.6.3.2 Energy Conservation and Load Management

"Energy conservation" refers to the more efficient use of electricity by customers in order to reduce load demand. Conservation incentive programs are designed to reduce energy consumption per customer, providing an increase in energy resources for new loads. "Load management" refers to power supply system improvements by a utility.

Load management programs direct all customer demand to be moved away from peak load hours, freeing existing resources to serve additional peak loads. While energy conservation and load management can somewhat reduce the demand for electric energy, they will likely not reduce the load growth to zero, thereby eliminating the need for new generation sources and new transmission lines to serve increased loads. Energy conservation and load management cannot be considered a reasonable alternative to the proposed Project. Therefore, this alternative was eliminated from further consideration.

2.6.4 Route Alternatives Considered and Eliminated

Multiple preliminary route alternatives for the proposed Vantage to Pomona Heights 230 kV Transmission Line Project were identified and presented for public and agency review and comment during the scoping period described in Section 1.2. The preliminary routes were also reviewed by BLM and JBLM YTC. Based on comments received during scoping and specific concerns expressed by the JBLM YTC, and based on environmental and construction feasibility, the following route alternatives were eliminated from further detailed consideration. The reason for eliminating these alternatives is provided in the following sections. Figure 2-6 shows the route alternatives considered and eliminated.

2.6.4.1 Alternative Route along Highway 243-Grant County

This alternative route segment generally followed State Highway 243 in Grant County, past the Desert Aire community, crossing the Saddle Mountains to a point just south of Beverly where it then paralleled the existing Vantage-Midway 230 kV transmission line into the Vantage Substation for a total route segment distance of 12.5 miles (see Figure 2-6). The concept with this alternative route segment was to utilize the highway for construction and maintenance access, with the placement of single steel or wood poles just outside of the edge of the highway ROW.

The WSDOT, Aviation Division expressed concern about the impact this alternative route segment would have on the long term viability of the Desert Aire Airport and its ability to function as an essential public facility. The agency conducted an airspace assessment of the route segment and concluded that based on the estimated pole height of 75 to 85 feet and an average span length of 600 feet, the route segment would encroach on the Desert Aire Airport airspace. Potential airspace conflicts included penetrating the approach surface of Runway 28 by 35 feet and being located in the Runway Protection Zone. These potential conflicts would represent significant threats to aircraft operations and safety at the airport. The agency recommended that this alternative route segment be eliminated from further consideration.

This alternative was eliminated from further consideration due to the significant threats to aircraft operations and safety at the Desert Aire Airport.

2.6.4.2 Alternative Routes East of Mattawa-Grant County

Portions of alternative routes located just east of Mattawa were eliminated from further consideration due to potential impacts to existing agricultural uses and operations. The potential impacts considered included loss of farmable land, orchards and vineyards, impacts to farming operations, including the relocation of wheel line irrigation systems and center pivot irrigation systems and safety hazards to aerial spraying operations and the use of helicopters to dry cherry orchards in the spring.

2.6.4.3 Alternative Routes on Yakima Training Center

Two major alternative routes considered would be located within JBLM YTC. These alternatives consisted of:

1) A northern route paralleling the existing Pacific Power, Pomona-Wanapum 230 kV Transmission Line to the south of the existing line (see Figure 2-6).
2) A southern route just inside the southern boundary of the JBLM YTC that would utilize an abandoned fire break road for structure placement and construction and maintenance access for most of its distance (see Figure 2-6).

In a letter from the Army, Installation Management Command, JBLM YTC dated May 28, 2010, the JBLM YTC outlined concerns that the overhead transmission lines have the potential to create significant aviation safety issues. To mitigate the safety risk, the letter stated that construction of the transmission line along portions of the alternative routes on JBLM YTC would have to be placed underground. More specifically the letter stated:

- The proposed southern routes create aviation safety issues along the installation boundary and in the vicinity of Training Area 10. Undergrounding of the transmission line would be required in this location for 16 kilometers (10 miles);
- The proposed east/west northern route parallel to the existing Pacific Power transmission line south into Training Areas 1 and 16 would present conflicts and safety concerns with aerial gunnery activities. The line must be underground or moved to the north of the existing line to mitigate safety concerns.

A meeting was held in Yakima, Washington on June 8, 2010 with JBLM YTC, BLM and Pacific Power representatives in attendance. One of the topics that was discussed at the meeting were the concerns the Army, Installation Management Command, JBLM YTC regarding impacts to aviation safety and the military training mission of JBLM YTC with these two proposed locations. JBLM YTC reiterated concerns expressed in the May 28 letter regarding the effect a new overhead transmission line would have on aviation safety and military training. JBLM YTC stated that it wanted to ensure training can be conducted safely, particularly as it relates to helicopter operations. Overhead transmission line alternatives on JBLM YTC have the potential to create a significant hazard as they are in the flight path to training ranges on the installation. JBLM YTC stated that it is scheduled to add a new aerial gunnery range in the north central part of the installation near Badger Pocket in a few years according to the installation's long range master plan. JBLM YTC stated it wanted to preserve its current and future missions and a new transmission line may adversely affect such missions. JBLM YTC explained that helicopters cross the JBLM YTC southern boundary en route to Training Area 10 in the southwest part of JBLM YTC and that an overhead line in that part of the installation would create a hazard for flight operations and therefore the line would have to be placed underground for approximately 16 kilometers (10 miles).

JBLM YTC reiterated that the northern route parallel to the existing Pomona-Wanapum 230 kV Transmission Line to the south into Training Areas 1 and 16 (see Figure 2-6) would present significant safety concerns and conflicts with aerial gunnery activities and aviation operations at the Multi-purpose Range Complex and the Multi-purpose Training Range and that the proposed transmission line must be buried (undergrounded) in these Training Areas to mitigate safety concerns and reduce impact to military training.

The proposed Vantage Pomona Power line 500 feet south of the existing Pomona-Wanapum 230 kV (PacifiCorp) power line would primarily impact helicopter pinnacle/ridgeline and zone reconnaissance operations along Saddle Mountains. Yakima ridge also offers this type of terrain, however primarily for individual training purposes, Saddle Mountains are the primary site for collective (multi-ship) training. Saddle Mountains contain the only ridges on JBLM YTC that meets both terrain and operational requirements for this type of collective training. The Saddle Mountains are ideal for aviation operations for many reasons. This ridge line is far from impact areas, not near any artillery firing points, and poses the least amount of risk for a catastrophic helicopter wire strike. Adding an additional line south of the existing line will take away the north side of the ridgeline for available avenues of approach, airspace and training.

The training area scheduling process to use the southern section of the training area is not conducive to short notice aviation training opportunities on JBLM YTC. The Saddle Mountains allows for aviation training opportunities on a short notice. Most short notice training opportunities will originate and terminate from JBLM YTC and these operations cannot be forecast in time to meet the scheduling criteria and not disrupt other Army training. Conducting aviation operations on Saddle Mountains will cause the least interference for competing ground training, while offering an ideal location for ridgeline aviation operations on short notice. No ridgelines exist on JBLM-Main to conduct these types of aviation operations, and due to the terrain on and around the Saddle Mountain, this area offers realistic training in preparation for aviation operations in Afghanistan and similar areas of operation. By the third quarter of fiscal year 2012 an additional aircraft will be assigned to JBLM resulting in a training increase of approximately 45 percent. Having this ridge available on short notice, without interfering with ground unit training, will be key to completing this training requirement. Adding an additional power line 500 feet south of the existing power lines would also restrict half of the airspace that would be required to recover from an in-flight malfunction/emergency (e.g., settling with power, engine failure). The closer the power lines are to the ridgeline, the less airspace is available for recovery.

JBLM YTC also stated that the existing Pacific Power (PacifiCorp) Pomona-Wanapum 230 kV Transmission Line must be placed underground to mitigate existing impacts to the JBLM YTC training mission; however, it is recognized that the burial of an existing transmission line is beyond the scope of this EIS. In addition, Pacific Power stated that it was impractical to consider undergrounding portions of the new transmission line and the entire existing transmission line on JBLM YTC. The existing Pomona-Wanapum 230 kV Transmission Line has been in place on JBLM YTC since the mid 1970s. Underground construction in the mountainous terrain of JBLM YTC may not be feasible from an engineering and constructability standpoint. Over 50 percent of the northern route is located on slopes greater than 30 percent. Over 30 percent of the southern route would be located on slopes greater than 30 percent. The cost to construct a line underground in such terrain would be 10 to 20 times more expensive than an overhead line if it were feasible. Placing a line underground also comes with significant operational risks regarding reliability; if there were ever a problem with the line, finding and repairing the fault would take the line out of service for days if not weeks.

JBLM YTC, BLM and Pacific Power representatives agreed that undergrounding of portions of the new line and the existing line were not reasonable or feasible because of engineering and constructability challenges, cost and reliability concerns resulting in these two proposed route alternatives on JBLM YTC being eliminated from further consideration.

2.6.4.4 Alternative Routes Columbia River Crossing below Priest Rapids Dam

Portions of the Southern alternative route segments, that proceeded down Umtanum Ridge before crossing the Columbia River below the Priest Rapids Dam were eliminated from further consideration due to extremely rugged terrain (e.g., slopes greater than 45 percent and vertical cliff faces) and associated constructability issues.

2.6.4.5 Alternative Route Following the Midway-Moxee 115 kV

Route Segment 2c follows a portion of the existing BPA Midway-Moxee 115 kV/Union Gap-Midway 230 kV transmission line for about 8.6 miles from the intersection of these two lines southeast of Moxee. The potential for routing in the area extending along the section of the Midway-Moxee 115 kV transmission line west of its divergence from the Union Gap-Midway 230 kV transmission line and north/east of Moxee was also considered. This alternative was eliminated from further consideration primarily due to the extensive amount of agricultural and residential development. Irrigated agriculture and circle pivot irrigation structures, as well as occupied structures, are directly adjacent to the existing ROW along a significant portion of the existing Midway-Moxee transmission line in this area, with some structures encroaching into the ROW. The density of the development, the potential need for occupied residential acquisition/demolition, conflicts with agricultural uses, and the additional length of the transmission line were reasons this route was eliminated from further consideration.

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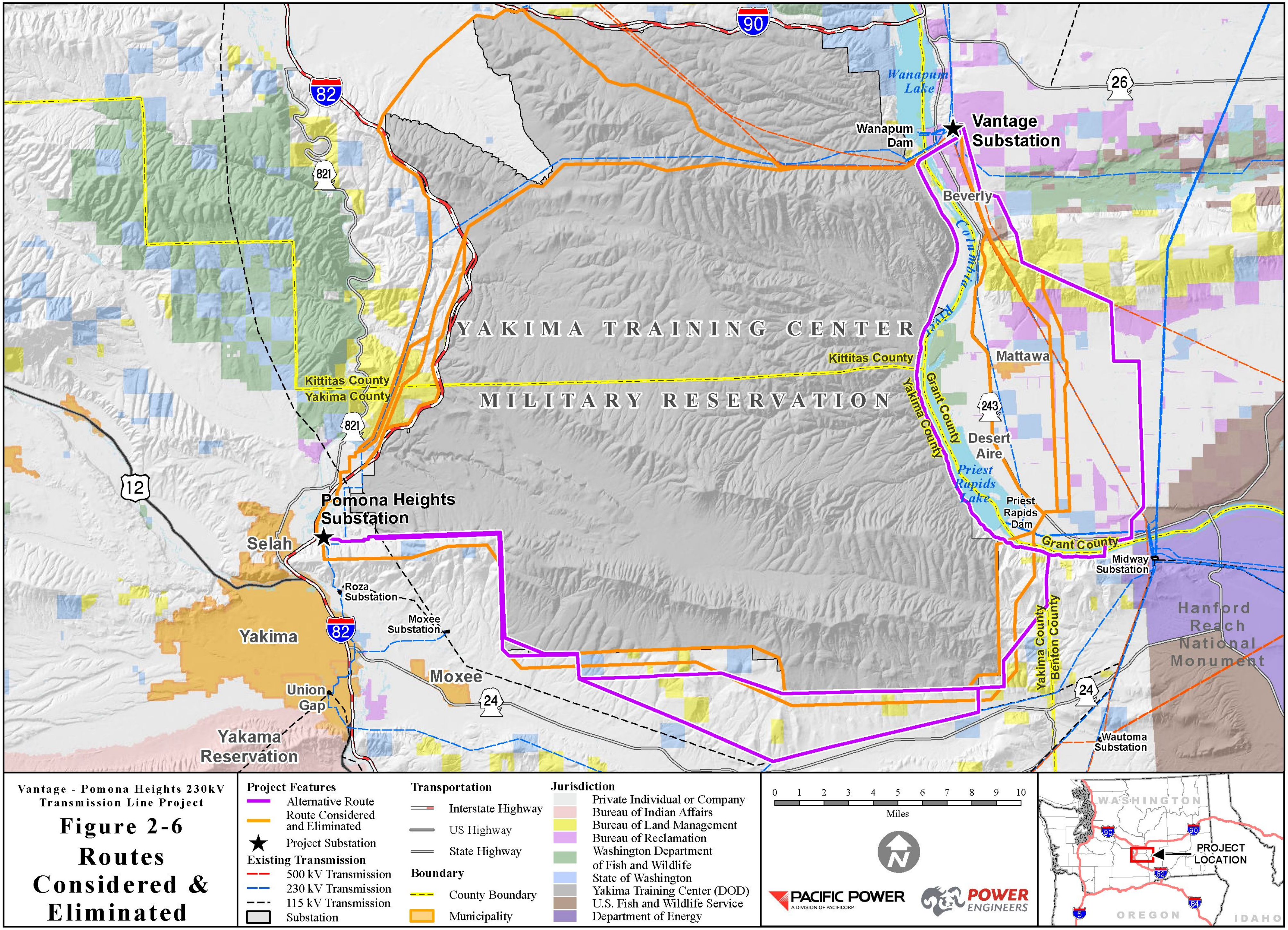

Vantage - Pomona Heights 230kV Transmission Line Project

Figure 2-6 Routes Considered & Eliminated

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2.7 COMPARISON OF ALTERNATIVES AND SUMMARY OF IMPACTS

This section presents a summary comparison of the alternatives by Zone (see Figure 2-1) based on impacts identified and summarized from Chapter 4 of this document, with mitigation measures and Project Design Features implemented. Impacts are presented on common routes and alternative routes within each Zone by resource. Impact data are presented in Tables 2-10 through 2-22 below. Tables 2-10 through 2-12 include (Zone 1) Route Segment 1a (common to all alternatives), and Alternative Route Segments 1b and 1c; Tables 2-13 through 2-15 present a summary of impact data for Route Segments common to all Alternatives (2a and 2d); Tables 2-16 through 2-18 present comparative impact data for Alternatives within Zone 2 (Route Segments 2b and 2c); and Tables 2-19 though 2-22 include (Zone 3) Route Segment 3a (common to all alternatives), and Alternative Route Segments 3b and 3c. The data contained in Tables 2-10 through 2-22 were derived from data in Chapters 2, 3, and 4 as well as data and comparisons developed for the (Agency) Preferred Route Selection Meeting conducted during the preparation of this EIS (see Section 2.8). Appendix D presents more detailed route comparison data and tables.

2.7.1 Zone 1 Alternative Comparisons (Route Segments 1b and 1c)

Route Segment 1a is common to all action alternatives in Zone 1. Summary impact data on this route is presented in Tables 2-10, 2-11, and 2-12.

Route Segment 1b (Agency Preferred Alternative) would be located on JBLM YTC land on its' southwestern boundary, and Route Segment 1c would be located directly south and west of the JBLM YTC boundary on private land. Route Segment 1b would create less long term ground disturbance compared to Route Segment 1c because of the reduced need for road construction and a shorter route length, and would have lower impacts on agriculture. Visual impacts on residences would also be lower for Route 1b. Impacts on sagebrush/perennial grassland habitat would be lower, and impacts on overstory tree vegetation would be higher. This Route Segment 1b would also have lower impacts than Route Segment 1c on water resources, cross fewer streams, have higher impacts on soil resources, cross less mapped landslide areas, and few steep slopes.

Conversely, Route Segment 1c would create more long-term ground disturbance and higher land use and visual impacts, and would be located primarily on private lands (1.0 mile would be located on state land). Also, this alternative would have higher impacts on sagebrush/perennial grassland habitat, higher impact on Tier 1 Sage-Grouse Priority Habitat, and higher impact on water resources. Route Segment 1c would cause lower impacts on soil resources, cross more mapped landslide area, and cross fewer steep slopes.

2.7.2 Zone 2 Alternative Comparisons (Route Segments 2b and 2c)

Route Segments 2a and 2d are common to all action alternatives in Zone 2. Summary impact data on these route segments are presented in Tables 2-16, 2-17, and 2-18.

Route Segment 2b would be located south of the JBLM YTC border, would cross sections of BLM land, and be located primarily on private land. This route segment does not parallel existing transmission lines, and would therefore create greater long-term ground disturbance primarily due to increased road construction as compared to Route Segment 2c even though the route would be 1.7 miles shorter. Fewer landowners and parcels would be crossed, and impacts would lower on irrigated agricultural land; however, this route segment has greater potential to impact designated Conservation Reserve Program (CRP) agricultural lands. Visual impacts on travelers and residences would be lower than Route Segment 2c because this route is further from sensitive viewers, but scenery impacts would be greater because this route would cross relatively intact landscapes. Fewer residences are located within 500 feet of this alternative. Route Segment 2b would have greater impacts on sagebrush-perennial grassland habitat, and have greater impacts on Tier 1 Sage-Grouse Priority Habitat. There are more sage-grouse leks within two miles, and a greater number of sage-grouse observations have occurred between 1988 and 2011 for this alternative. Impacts would also be higher to special status plant and potential habitat and Route Segment 2b crosses steeper slopes and mapped landslide areas. This alternative has a higher potential for cultural resources impacts.

Conversely, Route Segment 2c (Agency Preferred Alternative) crosses only state and private land, and would create less ground disturbance because the route parallels an existing transmission line. This alternative would cross a greater number of parcels and affect more private landowners as compared to Route Segment 2b. This alternative would impact 2.5 acres of irrigated agriculture and five circle pivots, and would have a lower potential to affect CRP land. Lower impacts would occur to sagebrush-perennial grassland habitat and Tier 1 Sage-Grouse Priority Habitat. Lower impacts on special status plants and potential communities and suitable habitat, and higher impacts on Marginal Habitat would also occur. Fewer sage-grouse leks are located within three miles, and a lower probability of cultural resource impacts would occur for this alternative.

2.7.3 Zone 3 Alternative Comparisons (Route Segments 3b and 3c)

Route Segment 3a is common to all action alternatives in Zone 3. Summary impact data on this route is presented in Tables 2-19, 2-20, 2-21 and 2-22.

Route Segment 3b would be located primarily on private land along an abandoned railroad ROW on the south and west sides of the Columbia River. Compared to Route Segment 3c, Route Segment 3b would cross less federal land, would be located within 500 feet of more residences (Auvil Fruit Company housing), and would cross fewer parcels and landowners. However, fewer residences would see the alternative within the immediate foreground viewing distance zone. This alternative would also have a greater visual impact on recreationists due to its proximity along a longer distance (Columbia River corridor) to such viewers. A greater number of active/inactive sage-grouse leks occur within three miles, but there are fewer observations between 1988 and 2011 as compared to Route Segment 3c. However, greater disturbance to Tier 1 Sage-Grouse Priority Habitat would occur. This alternative would have greater impacts to riparian and tree habitats, but lower impacts to special status plants and potential habitat. More intermittent and perennial streams would be crossed, lower overall water resource impacts, and greater soil resource impacts would occur for this alternative. The number or recorded cultural sites and the potential number of cultural resources occurring along Route Segment 3b are greater that Route Segment 3c. Many Native American special concern sites, including burial sites, spiritual and historic sites occur along this alternative, and impacts are expected to be higher than Route Segment 3c.

Route Segment 3c (Agency Preferred Alternative) would be located on a mix of federal land (BLM/Reclamation) and private land, and would cross agricultural areas along N Road and the Saddle Mountains in Grant County. Although this route parallels an existing transmission line for 6.5 miles, this route would create more long-term but less short-term ground disturbance than Route Segment 3b primarily because of longer route length and construction in steeper areas. This alternative also would cross and impact more irrigated agricultural lands, impact a greater number of parcels and private landowners, and affect a greater number of public grazing/oil/gas lease lands. Visual impacts on recreationists would occur along a shorter distance than Route 3b, but greater impacts to residences and scenery would occur. Greater impacts on Tier 3 and Tier 4 Sage-Grouse Priority Habitat and higher impacts on general habitat and special status plants/potential habitat would occur for this alternative. More steep slopes would be crossed for this alternative as compared to Route Segment 3b.

TABLE 2-10 ROUTE IMPACT DATA AND ALTERNATIVE COMPARISONS: ZONE 1 – LAND USE AND VISUAL

	Route Segment		
	Alternative Comparison		
	1a	1b (Agency Preferred Alternative)	1c
RESOURCE/ISSUE			
Land Use/Transportation/Recreation			
Jurisdiction (miles crossed)			
Federal	0.3 (13.6%) (of 2.3 miles [mi.])	12.5 (100%)	-
State	0	0	1.0 (7.8%) (of 12.9 mi.)
Private	2.0 (90.9%) (of 2.3 mi.)	0	11.9 (92.2%) (of 12.9 mi.)
Resources Crossed	0	0	0
Irrigated Agriculture (mi.)	0	0	0.4
# Circle Pivots	0	0	0
# Residences w/in 500'	63	2	17
# Parcels Crossed/# Private Landowners	21/14	3/2	74/49
Land Use Impacts	2.0 mi. *Moderate* land use impact; 1.8 acre (ac.) long-term disturbance to residential land uses	12.6 mi. *Moderate* land use impact; 11.2 ac. long-term disturbance to military land uses	0.1 mi. *High* land use impact; 2.1 mi. *Moderate* land use impact
New Road Construction (miles)	0.9	5.8	8.3
Visual			
	Immediate foreground views from residences, primarily	Foreground and middleground views from residences, primarily	Immediate foreground/foreground and middleground views from residences, primarily
	Crosses primarily residential character areas	Some immediate foreground views from residences	Crosses primarily Class C scenery
	Existing transmission lines infrastructure in area influencing character	Crosses primarily Class C scenery; Some residential character and industrial character areas	Some residential character, agricultural character and industrial character areas
	2.3 mi. *High* impact on residences; Scenic views from residences toward background mountains and valleys affected	No existing transmission lines or similar infrastructure	No existing transmission lines or similar infrastructure
	0.5 mi. *High* impact to moderately sensitive viewers	2.8 mi. *High* impact on residences; 0.5 mi. *High* impact to moderately sensitive viewers	

TABLE 2-11 ROUTE IMPACT DATA AND ALTERNATIVE COMPARISONS: ZONE 1 – WILDLIFE AND VEGETATION

	Route Segment		
	Alternative Comparison		
	1a	1b (Agency Preferred Alternative)	1c
RESOURCE/ISSUE			
Wildlife			
# Sage-Grouse Active or Inactive Leks			
Within 0.6/2.0/3.0 mi.	0/0/0	0/2/2	0/2/2
# PHS Historic Leks			
Within 0.6/2.0/3.0 mi.	0/0/0	1/2/4	0/2/3
# Observations			
(2001-2011)/(1988-2000)	(0)/(0)	(13)/(7)	(10)/(7)
Habitat Disturbance (Long Term ac./% in Project Area) & (Short Term ac./% in Project Area)			
Perennial Grassland	0	(3.1 ac./<1%)/ (10.4 ac /<1%)	(2.0 ac./<1%)/ (3.7 ac /<1%)
Riparian	0	0	0
Sagebrush/Perennial Grassland	(0.4 ac./<1%)/ (2.2 ac./<1%)	(5.1 ac /<1%)/ (23.1 ac /<1%)	(5.9 ac./<1%)/ (11.3 ac /<1%)
Trees/Aspen	0	(0.1 ac /<7%)/ (0.4 ac /<29%)	0
Sage-Grouse Priority Habitat Disturbance (Long Term ac./% in Project Area) & (Short Term ac./% in Project Area)			
Tier 1	(1.8 ac./<0.1%)/ (9.7ac.0.3%)	(11.3 ac./<0.1%)/ (46.6 ac./0.3%)	(22.5 ac./0.1%)/ (46.0 ac./0.3%)
Tier 3	0	0	(0.6 ac./<0.1%)/ (1.8 ac./0.1%)
Tier 4	0	0	0
Impacts to Wildlife	0.5 mi. of moderate impacts to habitat; 0.8 mi. of moderate impacts to sage-grouse habitat 2.2 mi. of Low Impact on Special Status Species	3.5 mi. of moderate impacts to nesting burrowing owls (w/in 1 mile); 5.4 mi. of moderate impacts to sage-grouse habitat.; 3.2 mi. of moderate impacts to a Priority Species Regional Area for long-billed curlew (w/in 1 mi.)	3.2 mi. of moderate impacts to nesting burrowing owls (w/in 1 mile); 3.1 mi. of moderate impacts to sage-grouse habitat; 0.1 mi. of moderate impacts to a Priority Species Regional Area for long-billed curlew (w/in 1 mi.)
Vegetation			
Special Status & Priority Habitats			
Suitable/Marginal Habitat (mi. crossed)	0.5/1.1	6.3/5.1	3.2/8.5
Special Status Plants Found During Survey (mi. crossed)	0	0.4	0
Long Term Disturbance to Sagebrush/Perennial Grassland (acres)	0.4	5.1	5.9
Impacts to Vegetation	*Moderate* Impacts to Special Status Plant Species and their Habitat - 0.5 mi.; Long Term Impacts to All Vegetation – 1.3 ac.	*Moderate* Impacts on General Vegetation – 6.4 mi.; *Moderate* Impacts on Special Status Species – 6.4 mi.; Overall Long Term Impacts to All Vegetation – 10.5 ac.	*Moderate* Impacts on General Vegetation – 3.1 mi.; *Moderate* Impacts on Special Status Species – 3.2 mi.; Overall Long Term Impacts to All Vegetation – 22.2 ac.

TABLE 2-12 ROUTE IMPACT DATA AND ALTERNATIVE COMPARISONS: ZONE 1 – CULTURAL RESOURCES AND OTHER ISSUES

	Route Segment Alternative Comparison 1a	 1b (Agency Preferred Alternative)	 1c
RESOURCE/ISSUE			
Cultural Resources*			
within 75' /250' of Centerline			
Districts	0/0	0/0	0/0
Archeological Sites	0/0	0/0	0/0
Isolated Finds	0/0	0/0	0/0
Architectural Resources	0/0	0/0	0/0
Total Cultural Resources	0/0	0/0	0/0
National Register Sites			
Eligible	0	0	0
Not Eligible	0	0	0
Unevaluated	0	0	0
Cultural Resource Impacts	No resources likely to be visually sensitive within 250'; Impacts to all resources likely to be low.	No resources likely to be visually sensitive within 250', Impacts to all resources likely to be low.	No resources likely to be visually sensitive within 250', Impacts to all resources likely to be low.
Water Resources Total Miles of Water Resource Crossed	0	1.1	1.3
Total Acres of Water Resource (Long Term) Disturbance	0	0	0
Impact to Water Resources	2.2 miles *No Identifiable*	1.1 miles *Low*	1.3 miles *Low*
Geologic Resources 30% Slope or greater crossed (mi.)	0	0.8	0.3
Mapped Landslide (High Hazard) crossed (mi.)	0	1.0	1.7
Soil Resources High Water erodibility (ac. long-term disturbance)	1.6	5.0	7.1
Total Short-Term Disturbance (ac.)	10.2	46.6	47.8
Total Long-Term Disturbance (ac.)	1.8	11.3	23.1
Construction Costs (w/out ROW)	*$1.18 million*	*$3.28 million*	*$3.50 million*

* - Cultural Resources identified based on record search

TABLE 2-13 ROUTE IMPACT DATA: ZONE 2 (ROUTE SEGMENTS 2A & 2D) – LAND USE AND VISUAL

	Route Segments Common to All Alternatives	
	2a	2d
RESOURCE/ISSUE		
Land Use/Transportation/Recreation		
Jurisdiction (miles crossed)		
Federal	0	1.0 (14.3%) (of 7.0 mi.)
State	0	0
Private	1.0 (100%)	6.0 (85.7%) (of 7.0 mi.)
Resources Crossed		
Irrigated Agriculture (mi.)	0	0
# Circle Pivots	0	0
# Residences w/in 500'	0	0
# Parcels Crossed/# Private Landowners	5/2	13/3
	1.0 mi. of Low Land Use Impacts; requires 0.8 mi. of new road construction	6.8 mi. of Low Land Use Impacts; requires 6.2 mi. of new road construction
Visual	*Middleground* views from residences	*Background* views from residences
	Crosses Class C scenery	Foreground views from the Columbia River
	No existing transmission lines or similar infrastructure	Crosses primarily Class *C* scenery
	0.1 mi. *High* impact on residences	Also crosses *Class B* scenery along Columbia River
	0.2 mi. *Moderate* impact to moderately sensitive viewers	No existing transmission lines or similar infrastructure
	1.0 mi. *Moderate* impact on scenic quality	1.9 mi. *Moderate* impact on residences
		2.2 mi. *Moderate* impact on moderately sensitive viewers
		3.1 mi. *High* impact on scenic quality

TABLE 2-14 ROUTE IMPACT DATA: ZONE 2 (ROUTE SEGMENTS 2A & 2D) – WILDLIFE AND VEGETATION

	Route Segments Common to All Alternatives	
	2a	2d
RESOURCE/ISSUE		
Wildlife		
# Sage-Grouse Active or Inactive Leks		
Within 0.6/2.0/3.0 mi.	0/0/0	0/0/1
# PHS Historic Leks		
Within 0.6/2.0/3.0 mi.	0/0/0	0/0/0
# Observations		
(2001-2011)/(1988-2000)	(0)/(0)	(1)/(0)
General Habitat Disturbance (Long Term ac./% in Project Area) & (Short Term ac./% in Project Area)		
Perennial Grassland	(0.2 ac./<0.1%)/(0.4 ac./<0.1%)	(0)/(0)/(2.6 ac./<1%)
Riparian	(0)/(0)	(0)/(0)
Sagebrush/Perennial Grassland	(0)/(0)	(12.7 ac./<1%)/(21.3 ac./<1%)
Trees/Aspen	(0)/(0)	(0)/(0)
Sage-Grouse Priority Habitat Disturbance (Long Term ac./% in Project Area) & (Short Term ac./% in Project Area)		
Tier 1	(2.1 ac./<1%)/(4.0 ac./<1%)	(15.3 ac./0.2%)/(26.5 ac./<0.3%)
Tier 3	(0)/(0)	(0)/(0)
Tier 4	(0)/(0)	(0)/(0)
	No known active or inactive leks within 0.6, 2 or 3 miles.	One known active or inactive lek within 3.0 miles. Low impact level with implementation of Project Design Features.
	1.0 mile of low impacts to habitat and special status species.	Moderate impacts for 5.1 miles to wildlife habitat.
	1.0 mile of low impacts to sage-grouse habitat.	Moderate impacts for 0.9 mile of a Priority Species Regional Area for chukar (w/in 1 mile).
		Moderate impacts to 5.8 miles of sage-grouse habitat.
		Moderate impacts to 4.5 miles of nesting raptors (ferruginous hawk and prairie falcon; w/in 1 mile).
Vegetation		
Special Status & Priority Habitats		
Suitable/Marginal Habitat (mi. crossed)	0/1.0	5.6/1.4
Special Status Plants Found During Survey	0	0.6
Impacts on General Vegetation (mi.)	*Low* 1.0	*Moderate* 5.2
Impacts on Special Status Species (mi.)	*Low* 1.0	*Moderate* 6.8
Long Term Impacts to All Vegetation (acres long term disturbance)	2.1	15.2
Vegetation Impacts		Special status plants identified during plant survey (Columbia milkvetch). Awned halfchaff sedge is known to occur within 1 mile.

TABLE 2-15 ROUTE IMPACT DATA: ZONE 2 (ROUTE SEGMENTS 2A & 2D) – CULTURAL RESOURCES AND OTHER ISSUES

	Route Segments Common to All Alternatives	
	2a	2d
RESOURCE/ISSUE		
Cultural Resources*		
within 75' /250' of Centerline		
Districts	0/0	0/0
Archeological Sites	0/0	1/1
Isolated Finds	0/0	0/0
Architectural Resources	0/0	0/0
National Register Sites		
Eligible	0/0	0/0
Not Eligible	0/0	0/0
Unevaluated	0/0	1/1
Total Cultural Resources	0/0	1/1
Cultural Resource Impacts	No resources likely to be visually sensitive within 250'	9 sites recorded within one mile (on south side of Columbia River).
	Impacts to all resources expected to be *Low* to *Moderate.*	Sites include lithic scatters
		Potential disturbance to Hanford Grade (Chicago, Milwaukee, & St. Paul Railroad) causing *High* physical impact
		Reported burial site within 0.25 mi. burial site may be visually sensitive
		Wanapum Village site of special concern (2.3 mi. from route) across Columbia River
		Impacts to all resources expected to be *Low* to *High.*
Water Resources Total Miles of Water Resource Crossed	0.1	1.3
Total Acres of Water Resource (Long Term) Disturbance	0	0
Impacts to Water Resources (mi.)	*Low* 0.1	*Moderate* 1.3
Geologic Resources 30% Slope or greater crossed (mi.)	0	0.9
Mapped Landslide (High Hazard)(mi.)	0	1.9
Soil Resources High Water erodibility (ac. long-term disturbance)	2.1	10.2
Total Short-Term Disturbance (ac.)	4.0	59.6
Total Long-Term Disturbance (ac.)	2.1	35.7
Construction Costs (w/out ROW)	$250,000	$2.0 million

*Cultural Resources identified based on records search

TABLE 2-16 ALTERNATIVE COMPARISONS: ZONE 2 (ROUTE SEGMENTS 2B & 2C) – LAND USE AND VISUAL

	Route Segment	
	2b	2c (Agency Preferred Alternative)
RESOURCE/ISSUE		
Land Use/Transportation/Recreation		
Jurisdiction (miles crossed)		
Federal	0.7 (4.3%) (of 16.4 mi.)	-
State	-	1.0 (5.5%) (of 18.1 mi.)
Private	15.7 (95.7%) (of 16.4 mi.)	17.1 (94.5%) (of 18.1 mi.)
Resources Crossed		
Irrigated Agriculture (mi.)	0	0.9
# Circle Pivots	0	5
# Residences w/in 500’	0	1
# Parcels Crossed/# Private Landowners	5/2	44/8
Land Use Impacts (mi.)	16.4 mi. *Low*	0.5 mi. *High* 2.5 mi. *Moderate* 2.5 ac. long-term disturbance to irrigated agriculture
Miles New Road Construction	17.1	11.3
Visual		
	Background or seldom-seen views from residences, primarily	Middleground and background views from State Highway 24, primarily
	Crosses primarily Class C scenery	Immediate foreground and foreground views from some residences
	No existing transmission lines or similar infrastructure	Some residential character, agricultural character and industrial character areas
	0.1 mi. *High* impact on residences	Crosses primarily Class C scenery
	2.6 mi. *Moderate* impact to moderately sensitive viewers	Parallels existing transmission line for portion of route
	14.6 mi. *Moderate* impact on scenic quality	0.7 mi. *High* impact on residences
	Compliant with Interim VRM Class III	4.0 mi. *Moderate* impact on moderately sensitive viewers
		8.7 mi. *Moderate* impact on scenic quality

TABLE 2-17 ALTERNATIVE COMPARISONS: ZONE 2 (ROUTE SEGMENT 2B & 2C) – WILDLIFE AND VEGETATION

	Route Segment Alternative Comparisons	
	2b	2c (Agency Preferred Alternative)
RESOURCE/ISSUE		
Wildlife		
# Sage-Grouse Active or Inactive Leks		
Within 0.6/2.0/3.0 mi.	0/2/2	0/0/2
# PHS Historic Leks		
Within 0.6/2.0/3.0 mi.	0/0/0	0/0/0
# Observations		
(2001-2011)/(1988-2000)	4/1	0/0
General Habitat Disturbance (Long Term ac./% in Project Area) & (Short Term ac./% in Project Area)		
Perennial Grassland	(1.6 ac./<1%) (2.5 ac./<1%)	(0.1 ac./<1%) (0.4 ac./<1%)
Riparian	-	-
Sagebrush/Perennial Grassland	(25.5 ac./<1%) (40.3 ac./<1%)	(8.0 ac./<1%) (16.8 ac./<1%)
Trees/Aspen	-	-
Sage-Grouse Priority Habitat Disturbance (Long Term ac./% in Project Area) & (Short Term ac./% in Project Area)		
Tier 1	(35.7 ac./0.2%) (59.6 ac./0.3%)	(21.6 ac./0.1%) (60.7 ac./0.3%)
Tier 3	0	(1.1 ac./0.1%) (5.4 ac./0.1%)
Tier 4	0	-
Wildlife Impacts	1.9 miles Moderate impact to Black-tailed Jackrabbit (w/in 1 mile)	5.3 miles of Moderate Impact to burrowing owl nests (w/in 1 mile)
		0.8 miles of Moderate Impact to Long-Billed Curlew nesting area (w/in 1 mile)
Vegetation		
Special Status & Priority Habitats		
Suitable/Marginal Habitat (mi. crossed)	11.4/3.9	4.6/6.0
Special Status Plants Found During Survey (mi. crossed)	0.5	0
Long Term Impacts to All Vegetation (acres long term disturbance)	33.5	17.5
Moderate Impacts on General Vegetation (mi.)	11.1	4.6
Moderate Impacts on Special Status Species (mi.)	11.8	4.6
Vegetation Impacts	Special status plants identified during plant survey (Columbia Milkvetch).	Columbia Milkvetch is known to occur within 1 mile.

TABLE 2-18 ALTERNATIVE COMPARISONS: ZONE 2 (ROUTE SEGMENT 2B & 2C) – CULTURAL RESOURCES AND OTHER ISSUES

	Route Segment Alternative Comparisons	
	2b	2c (Agency Preferred Alternative)
RESOURCE/ISSUE		
Cultural Resources*		
within 75' /250' of Centerline		
Districts	0/0	0/0
Archeological Sites	0/0	0/0
Isolated Finds	0/0	0/0
Architectural Resources	0/0	0/0
National Register Sites		
Eligible	0/0	0/0
Not Eligible	0/0	0/0
Unevaluated	0/0	0/0
Total Cultural Resources	0/0	0/0
Cultural Resource Impacts	36 sites recorded within one mile.	12 previously recorded sites within one mile; includes lithic scatters & talus pits
	Historic sites include trash scatters and remains of homesteads	Historic trash scatters & stage stop/outbuildings Burial site within 0.5 mile of route
	Know burial site 0.85 mile from route Talus pit 0.6 mile from route	Talus and burial sites could be visually sensitive
	Burial site and talus pit may be visually sensitive	Stage stop may be visually sensitive; integrity in question
	Impacts to all resources expected to be *Low* to *Moderate*.	No sites of special concern identified
		Impacts to all resources expected to be *Low* to *Moderate*.
Water Resources Total Miles of Water Resource Crossed	2.6	2.2
Total Acres of Water Resource (Long Term) Disturbance	0	0
Impact to Water Resources (mi.)	2.6 *Low*	2.2 *Low*
	Short term disturbance to Firewater Canyon and 25 unnamed intermittent streams	Short term disturbance to 22 unnamed intermittent streams
Geologic Resources 30% Slope or greater crossed (mi.)	0.2	0
Mapped Landslide (High Hazard) (mi.)	0.2	0
Soil Resources High Water erodibility (ac. long-term disturbance)	15.2	17.0
Total Short-Term Disturbance (ac.)	59.6	66.1
Total Long-Term Disturbance (ac.)	35.7	22.7
Construction Costs (w/out ROW)	$4.03 million	$4.78 million

*Cultural Resources identified based on records search

TABLE 2-19 ROUTE IMPACT DATA AND ALTERNATIVE COMPARISONS: ZONE 3 (ROUTE SEGMENTS 3A, 3B & 3C) – LAND USE AND VISUAL

	Route Segment		
	Alternative Comparison		
	3a	3b	3c (Agency Preferred Alternative)
RESOURCE/ISSUE			
Land Use/Transportation/Recreation			
Jurisdiction (miles crossed)			
Federal	-	2.7 (12.4% of 20.2 mi.)	9.6 (37.8 % of 25.2 mi.)
State	-	-	-
Private	0.1 (100%)	17.5 (87.5% of 20.2 mi.)	15.6 (62.2% of 25.2 mi.)
Resources Crossed			
Irrigated Agriculture (mi.)	0	0	2.7
# Circle Pivots	0	0	9
# Residences w/in 500'	0	21	14
# Parcels Crossed/# Private Landowners	1/1	55/3	79/27
	Low land use impact	1.7 miles of Moderate Land Use Impact	0.4 miles High Land Use Impact
New Road Construction (mi.)	Requires minimal road construction	8.5	6.3
Land Use Impacts			1.3 acres long-term impact to agricultural land
Visual			
	Middleground Views from road	Immediate foreground and foreground views from Columbia River and Priest Rapids Reservoir, John Wayne Pioneer Trail, residences	Immediate foreground and foreground views from Columbia River, Beverly Sand Dunes OHV Park, Nunnally Lake fisting access, John Wayne/Milwaukee Road Trail, Saddle Mountains, Burkett Lake Recreation Area, residences along "N" Road, "O" Road, & north of Beverly
	Crosses industrial character area	Crosses primarily Class B scenery, some residential character, agricultural character and industrial character areas. Existing transmission lines or similar infrastructure only at Wanapum crossing	Crosses primarily Class C scenery and residential-agricultural character areas. Existing transmission lines or similar infrastructure north of Columbia River crossing & Hanford-Vantage line
	Weak contrasts	3.4 miles *High* impact on residences; 3.2 miles *High* impact to highly sensitive viewers (recreation/travel); 6.7 miles *High* impact on moderately sensitive viewers (recreation/travel); 4.3 miles *High* impact on scenic quality	5.9 miles *High* impact on residences; 2.6 miles *High* impact to highly sensitive viewers (recreation/travel); 4.0 miles *High* impact on moderately sensitive viewers (recreation/travel); 5.3 miles *High* impact on scenic quality
	Low visual impacts	Compliant with Interim VRM Class III (0.4 miles.)	Compliant with Interim VRM Class III (4.5 miles)

TABLE 2-20 ROUTE IMPACT DATA AND ALTERNATIVE COMPARISONS: ZONE 3 (ROUTE SEGMENTS 3A, 3B & 3C) – WILDLIFE AND VEGETATION

	Route Segment		
	Alternative Comparison		
	3a	3b	3c (Agency Preferred Alternative)
RESOURCE/ISSUE			
Wildlife			
# Sage-Grouse Active or Inactive Leks			
Within 0.6/2.0/3.0 mi.	0/0/0	0/1/1	0/0/0
# PHS Historic Leks			
Within 0.6/2.0/3.0 mi.	0/0/0	0/0/0	0/0/0
# Observations			
(2001-2011)/(1988-2000)	(0) (0)	2/1	4/0
Habitat Disturbance (Long Term ac./% in Project Area) & (Short Term ac./% in Project Area)			
Perennial Grassland	0/0	(0.7 ac./<1%)/(2.5 ac./<1%)	0/0
Riparian	0/0	(0.4 ac./<1%)/(0.7 ac./<1%)	(0.3 ac./<1%)/(1.2 ac./<1%)
Sagebrush/Perennial Grassland	(0.1 ac./<1%) (1.1 ac./<1%)	(6.4 ac./<1%)/ (19.2 ac./<1%)	(11.9 ac./<1%)/(37.7 ac./<1%)
Trees/Aspen	0/0	(1.2 ac./6%)/ (5.9 ac./28%)	0/0
Sage-Grouse Priority Habitat Disturbance (Long Term ac./% in Project Area) & (Short Term ac./% in Project Area)			
Tier 1	(0) (0)	(22.5 ac./0.1%)/ (54.1 ac./0.3%)	(3.6 ac./0.1%)/ (6.7 ac./0.3%)
Tier 3	(0.1ac./<0.1%)/(0.5 ac./<0.1%)	(5.4 ac./<1%)/ (14.8 ac./0.2%)	(12.9 ac./0.1%)/ (45.0 ac./0.3%)
Tier 4	(0) (0)	(0) (0)	(4.4 ac./0.1%)/ (13.2 ac./0.4%)
Wildlife Impacts	0.1 mile of Low Impact to habitat; 0.1 mile of Moderate Impact to sagebrush lizard, striped whipsnake, nightsnake and black-tailed jackrabbit (w/in 1 mile); 0.1 mile. Low impacts to a Priority Species Regional Area for mule deer (w/in 1 mile); Low Impacts to Tier 3 habitat.	6.8 miles of moderate impacts to sagebrush lizard, striped whipsnake and nightsnake (w/in 1 mile)	5.1 miles of moderate impacts to sagebrush lizard, striped whipsnake and nightsnake (w/in 1 mile); 1.7 miles of moderate impacts to black-tailed jackrabbit (w/in 1 mile); 2.7 miles of moderate impacts to Priority Regional Species Areas for chukar. 14.3 miles of moderate impacts to nesting raptors (prairie falcon, peregrine falcon, golden eagle; w/in 1 mile).
Vegetation			
Special Status & Priority Habitats			
Suitable/Marginal Habitat (mi. crossed)	0.1/0	7.4/1.8	10.5/5.7
Special Status Plants Found During Survey	0	1.2	0
Long Term Disturbance to Sagebrush/Perennial Grassland (mi)	0.1	6.9	11.9
Impacts to General Vegetation & Special Status Species	*Low – 0.1 mi.*	*Moderate* 7.3 mi./8.3 mi.	*Moderate* 9.8 mi./13.3 mi.
Long Term Impacts to All Vegetation (acres)	0.1	10.5	19.0

TABLE 2-21 ROUTE IMPACT DATA AND ALTERNATIVE COMPARISONS: ZONE 3 (ROUTE SEGMENTS 3A, 3B & 3C) – CULTURAL RESOURCES

	Route Segment		
	Alternative Comparison		
	3a	3b	3c (Agency Preferred Alternative)
RESOURCE/ISSUE			
Cultural Resources*			
within 75' /250' of Centerline			
Districts	0/0	1/1	0/0
Archeological Sites	2/2	40/71	9/18
Isolated Finds	0/0	3/9	2/11
Architectural Resources	1/1	1/1	1/1
National Register Sites			
Eligible	1/1	3/3	1/1
Not Eligible	1/1	5/10	3/12
Unevaluated	1/1	37/69	8/17
Total Cultural Resources	3/3	45/82	12/30
Cultural Resource Impacts	Extensive surveys conducted around Wanapum Dam and Vantage Substation; 150 previously recorded sites	No intensive surveys, but hundreds of resources identified	Cultivated areas not likely to contain cultural resources (35%)
	Impacts may be *High* on unevaluated sites	Lithic scatters, village sites, burials, rock shelters, rock features, petroglyphs & pictographs, many historic sites; Hanford Grade	Hundreds of sites in Saddle Mountain within one mile
	Vantage Substation, Midway to Vantage #1 Transmission Line and Vantage to Columbia #1 Transmission Line recorded as cultural resources	Many special concern sites; including burial sites, spiritual & historic sites	105 sites within one square mile in Saddle Mountains
	No sites of special concern within 3 miles of route.	Wanapum Village long house & sweat lodge proximity	Isolated finds, lithic scatters, pits, rock cairns
	Overall impacts expected to be *Low*	Resources likely to be visually sensitive and visual impacts *High*	Hanford Grade, Midway to Vantage #1 Transmission Line
		Impacts to resources expected to be *High*.	Visual impacts expected to be *Moderate*
			Wanapum Village, geologic formation along river, Saddle Mountains, Wahluke Slope special concern sites; with *Moderate* to *High* impacts

*Cultural Resources identified based on records search

TABLE 2-22 ROUTE IMPACT DATA AND ALTERNATIVE COMPARISONS: ZONE 3 (ROUTE SEGMENTS 3A, 3B & 3C) – OTHER RESOURCES AND ISSUES

	Route Segment		
	Alternative Comparison		
	3a	3b	3c (Agency Preferred Alternative)
RESOURCE/ISSUE			
Water Resources Total Miles of Water Resource (Crossed	0	0.5	0.8
Total Acres of Water Resource (Long Term) Disturbance	0	0	0
Impact to water resources (mi.)	No Impacts to water resources	0.4 *Low*	0.8 *Low*
Geologic Resources 30% Slope or greater crossed (mi.)	0	0.1	1.3
Mapped Landslide (High Hazard)	0	0.5	0.1
Soil Resources High Water erodibility (ac. long-term disturbance)	0	18.5	1.0
Total Short-Term Disturbance (ac.)	1.1	77.0	95.5
Total Long-Term Disturbance (ac.)	0.1	30.9	26.3
Construction Costs (w/out ROW)	$224,000	$12.0 million	$9.98 million

2.8 PREFERRED ALTERNATIVE

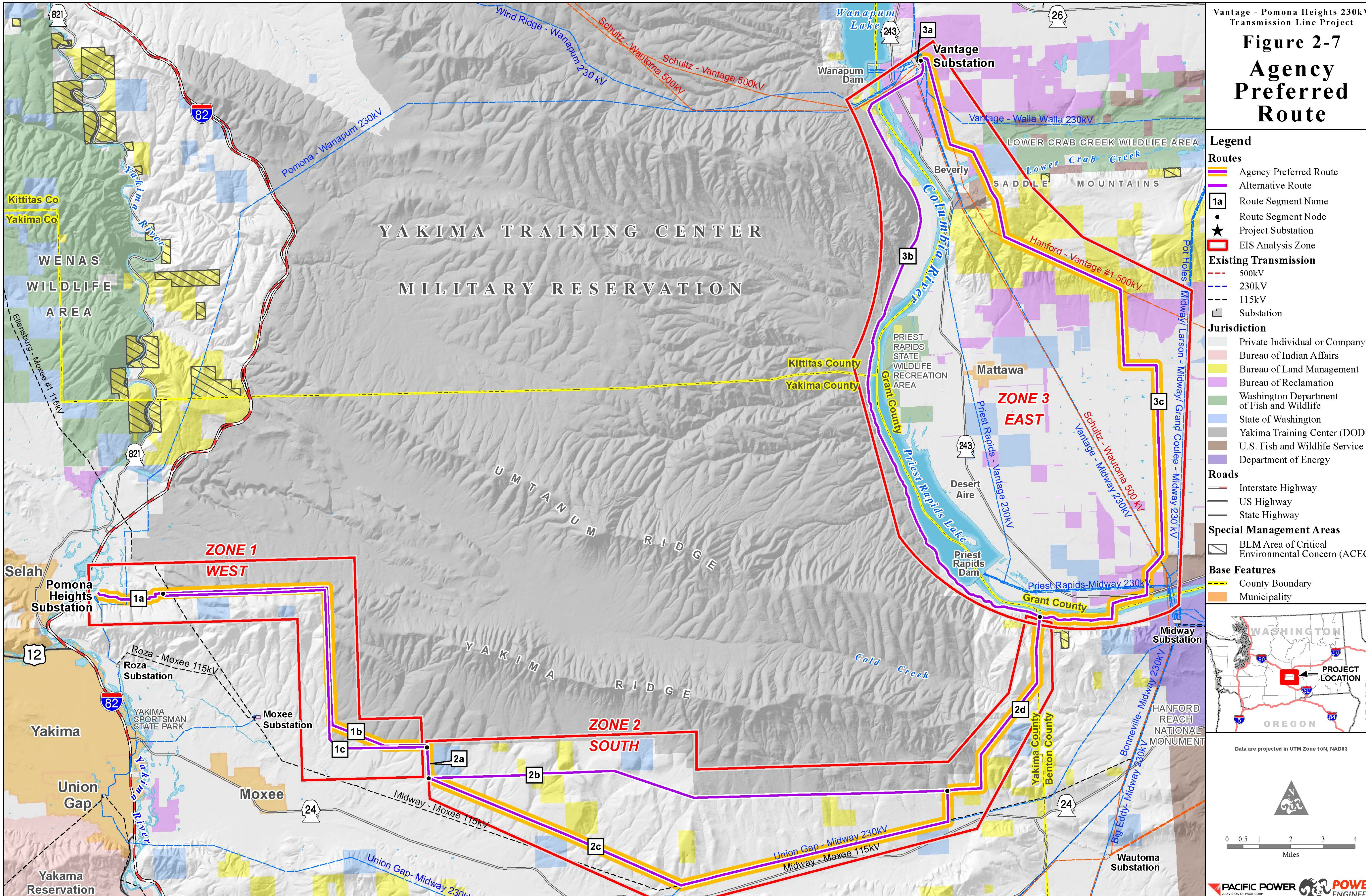
To aid in the selection of an Agency Preferred Alternative pursuant to the requirements of 40 C.F.R. 1502.14(e), which states that the lead agency shall "identify the agency's preferred alternative or alternatives, if one or more exists, in the draft statement," a workshop was conducted during the preparation of this EIS. The Preferred Route Selection Workshop was held in Yakima, Washington on May 17, 2012, and included 40 participants from the BLM (lead agency), the Army JBLM YTC (cooperator), BPA (cooperator), Reclamation (cooperator), Yakima County (cooperator), Grant County (cooperator), Pacific Power (proponent), the Washington Department of Fish and Wildlife (WDFW), and POWER Engineers, Inc. (third-party contractor assisting in the preparation of the EIS). Representatives from the Confederated Tribes and Bands of the Yakama Nation and Wanapum Band of Indians were also in attendance at the meeting.

The purpose of the workshop was to solicit input on the selection of the lead agency's (BLM) Preferred Alternative. During the meeting, relevant environmental resource inventory data, environmental impact analysis results, and Project operational, economic, engineering and other selection criteria (including all of the data presented in Tables 2-10 through 2-22 and Appendix D) were presented to the participants. Prior to the workshop, the cooperating agencies were provided the opportunity to review and comment on the content of the information and data presented during the workshop as part of the agencies review of the preliminary draft document sections (Chapters 2, 3, and 4).

After presentation of the comparative data of each route segment within each Zone, workshop participants (aside from the third-party contractor and the Project proponent) were asked their route segment preference within each zone. A summary of the participant's route segment preferences were documented and considered by the BLM in determination of the Preferred Alternative.

Primary issues raised by the cooperating agencies and the Native American Tribes were related to cultural resources, Native American practices and traditional uses, the extent of existing cultural, vegetation, and wildlife (sage-grouse) surveys previously conducted in the Project area, sage-grouse habitat impacts, and agricultural impacts. There was no clear consensus among the cooperating agencies and tribes as to the preferred route in Zone 1; some agencies preferred Route Segment 1b due to lower impacts on land use, while others preferred Route Segment 1c due to lower sage-grouse impacts, traditional use impacts and cumulative effects. Other agencies were neutral on route segment choice within Zone 1. In Zone 2, a clear preference among the participants emerged as a result of the discussion, Route 2c was overwhelmingly preferred, primarily due to reduced sage-grouse impacts, although several agencies stated that they felt more study of cultural and natural resources (plants, birds) was needed. Other concerns expressed by the agencies that preferred Route 2c included distance from military training activities, lower vegetation impacts, and proximity of the route to an existing corridor (that would minimize cumulative impacts). Those agencies that expressed a preference for Zone 3 indicated that Route Segment 3c would be the preferred route primarily due to reduced cultural resource and Native American impacts, although one agency preferred Route 3b due to the potential impacts on agricultural activities occurring along Route 3c.

The BLM Preferred Alternative consists of Route Segments 1a, 1b, 2a, 2c, 2d, 3a, and 3c (Alternative D). The Preferred Alternative is located on JBLM YTC, parallels the Midway-Moxee 115 kV/Union Gap 230 kV corridor north of State Highway 24, follows N Road in Grant County, parallels the Hanford-Vantage #1 500 kV transmission line, traverses the Saddle Mountains, and connects with the Vantage Substation from the northeast side of the Columbia River. Figure 2-7 presents the Agency Preferred Alternative.



Vantage - Pomona Heights 230kV Transmission Line Project
Figure 2-7
Agency Preferred Route
Legend
Routes
Agency Preferred Route
Alternative Route
Route Segment Name
Route Segment Node
Project Substation
EIS Analysis Zone
Existing Transmission
500kV
230kV
115kV
Substation
Jurisdiction
Private Individual or Company
Bureau of Indian Affairs
Bureau of Land Management
Bureau of Reclamation
Washington Department of Fish and Wildlife
State of Washington
Yakima Training Center (DOD)
U.S. Fish and Wildlife Service
Department of Energy
Roads
Interstate Highway
US Highway
State Highway
Special Management Areas
BLM Area of Critical Environmental Concern (ACEC)
Base Features
County Boundary
Municipality
WASHINGTON
OREGON
IDAHO
PROJECT LOCATION
Data are projected in UTM Zone 10N, NAD83
0 0.5 1 2 3 4
Miles
PACIFIC POWER
POWER ENGINEERS
YAKIMA TRAINING CENTER
MILITARY RESERVATION
ZONE 1 WEST
ZONE 2 SOUTH
ZONE 3 EAST
UMTANUM RIDGE
YAKIMA RIDGE
WENAS WILDLIFE AREA
LOWER CRAB CREEK WILDLIFE AREA
SADDLE MOUNTAINS
PRIEST RAPIDS STATE WILDLIFE RECREATION AREA
HANFORD REACH NATIONAL MONUMENT
Vantage Substation
Pomona Heights Substation
Midway Substation
Wautoma Substation
Roza Substation
Moxee Substation
Wanapum Dam
Priest Rapids Dam
Wanapum Lake
Columbia River
Priest Rapids Lake
Yakima River
Lower Crab Creek
Cold Creek
Kittitas Co
Yakima Co
Kittitas County
Yakima County
Grant County
Benton County
Yakama Reservation
YAKIMA SPORTSMAN STATE PARK
Selah
Yakima
Union Gap
Moxee
Mattawa
Beverly
Desert Aire
1a
1b
1c
2a
2b
2c
2d
3a
3b
3c
Wind Ridge - Wanapum 230 kV
Schultz - Wautoma 500kV
Schultz - Vantage 500kV
Pomona - Wanapum 230kV
Vantage - Walla Walla 230kV
Hanford - Vantage #1 500kV
Priest Rapids - Vantage 230kV
Vantage - Midway 230kV
Schultz - Wautoma 500 kV
Larson - Midway Grand Coulee - Midway 230 kV
Pot Holes - Midway
Priest Rapids-Midway 230kV
Ellensburg - Moxee #1 115kV
Roza - Moxee 115kV
Midway - Moxee 115kV
Union Gap - Midway 230kV
Bonneville - Midway 230kV
Big Eddy - Midway 230kV
821
82
12
24
26
243

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CHAPTER 3 AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This chapter describes the environment and resources that the alternatives described in Chapter 2 may potentially affect. Chapter 3 describes the current condition of each resource and relevant characteristics that may be subject to impacts from the Project. Environmental resource baseline information is presented comparing potential impacts from the route alternatives and the no action alternative which are analyzed in Chapter 4.

Identified resources that may be affected by the Project have been carried forward for analysis and are discussed in Chapters 3 and 4. These resources include:

- Vegetation and Special Status Plant Species
- Wildlife and Special Status Wildlife Species
- Land Jurisdiction and Land Use
- Recreation
- Special Management Areas
- Transportation
- Visual Resources
- Socioeconomics
- Environmental Justice
- Cultural Resources and Native American Concerns
- Wildland Fire Ecology and Management
- Climate and Air Quality
- Water Resources
- Geology and Soils

Resource inventories were developed for the area within the analysis corridors in sufficient detail to assess the potential impacts that could result from the proposed Project. The width of the analysis corridors along each alternative route segment differs for each of the resource disciplines, depending on the area that potentially could be affected. The precise location of the centerline would be determined through engineering surveys of the selected route prior to construction. Land use, earth (soils and geology), water and cultural resources were inventoried within a two mile-wide corridor (one mile on either side of the assumed centerlines of the alternative route segments). Biological resources were also inventoried within a two mile-wide corridor (one mile either side of the assumed centerlines). Visual resources were inventoried within a six mile-wide corridor (three miles on either side of the assumed centerlines). Data and information for social and economic conditions in the Project area are based on county and state-wide data and cannot be tailored to the analysis corridors.

Maps illustrating resource data within the Project area and analysis corridors are located in Appendix A. Resource data was documented along the alternative route segments. The resource discussions in this chapter reference the route segments shown on the resource maps, providing a geographic reference to the resource data.

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3.2 VEGETATION AND SPECIAL STATUS PLANT SPECIES

This section describes the vegetation, special status plant species, and noxious weeds present within the Project area. For the purposes of this analysis, the Project area was defined as a two mile-wide corridor; one mile on either side of alternative route segment centerlines.

The analysis considered issues related to vegetation raised during the public scoping process, which occurred during January and February of 2010 and January of 2011. Scoping comments included concerns regarding the impacts to vegetation communities through construction and maintenance activities, specifically disturbance to sagebrush and native grassland communities. Concerns were also raised regarding impacts to special status plant species, and the potential for the introduction and spread of noxious weeds and control measures to be implemented. These comments were considered during data collection and analysis of vegetation and special status plant species within the Project area.

3.2.1 Data Sources

The evaluation was conducted using planning documents, Project-specific field studies, digital data sources, and previously conducted studies. Sources reviewed included:

- U.S. Department of the Army (Army), Final Environmental Impact Statement (EIS) for Fort Lewis Army Growth and Force Structure Realignment, July 2010.
- Hanford Reach National Monument Final Comprehensive Conservation Plan and EIS, August 2008.
- Terrestrial Habitat Assessment Priest Rapids Project Federal Energy Regulatory Commission (FERC) 2114 Final Report, January 2003.
- Biological Assessment for Bonneville Power Administration (BPA) Schultz-Hanford Area Transmission Line, September 2002.
- Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) Cultural and Natural Resource Management Plan (RMP), January 2002.
- Spokane District RMP (1985) and Record of Decision (ROD)(1987) and the 1992 RMP amendment (BLM 1992) and ROD.
- Sage-Grouse Aerial Lek Survey Report (2010 and 2011) for the Proposed Vantage to Pomona 230 kV Transmission Line Project (POWER Engineers 2011).
- Sage-Grouse Habitat Assessment Report, August 2011 (POWER Engineers 2011).
- Special Status Plant Species Survey Report, August 2011 (POWER Engineers 2011).
- Noxious Weed Survey Report, August 2011 (POWER Engineers, 2011).
- Digital element occurrence records of current and historical rare and imperiled species were obtained from Washington National Heritage Program (WNHP).
- Washington Gap Analysis data (GAP) was obtained from the U.S. Geological Survey (USGS) Gap Analysis program.

3.2.2 Current Conditions and Trends, Regional Overview

3.2.2.1 Vegetation Cover Types

Vegetation cover types were documented on approximately 450 acres of accessible federal lands crossed by the alternative route segments. Information collected was used to assess habitat suitability for rare plants and to provide a detailed vegetation map for the Project area. Approximately 224 acres of federal lands crossed by alternative route segments were considered inaccessible due to: restricted access on the JBLM YTC; access issues crossing private lands; dangerously steep terrain; and excessively long distances (greater than one mile) to hike from car to the right-of-way (ROW) corridor. For non-federal lands and federal lands that were inaccessible during the surveys, vegetation cover types were estimated using aerial interpretation. Data sources for aerial interpretation included 2001 JBLM YTC vegetation data (JBLM YTC 2002), GAP data, and fire history data. This information is provided in Appendix A: Vegetation and Fire History and Appendix B-3: Special Status Plant Report. A summary of vegetation cover types is presented in Table 3.2-1.

The Project area lies within the Columbia Plateau ecoregion (EPA 2010). The Columbia Plateau is an arid sagebrush (*Artemisia* spp.) steppe and grassland that is surrounded by ecoregions that are typically moister, forested and mountainous (EPA 2010). Plant communities within the Project area and its immediate vicinity have been altered by roads, urban development, military activities, livestock grazing, agriculture, noxious weeds and fire. The western portion of the Project area (Zone 1) is comprised primarily of big sagebrush (*Artemisia tridentata*) and perennial grasslands. Disturbed sagebrush/perennial grasslands in Zone 1 are largely associated with urban development, roads, JBLM YTC's fire break and several small fires that have occurred in the area. The southern portion of the Project area (Zone 2) consists of a mosaic of sagebrush communities and annual grasslands. Vegetation in the eastern portion of Zone 2 has been disturbed by several large fires and livestock grazing and is currently dominated by annual grasslands. Vegetation in the eastern portion of the Project area (Zone 3) is a mixture of sagebrush communities and areas that have been disturbed by roads, agricultural, and fire.

Shrublands and grasslands are the main vegetation cover type within the Project area. A summary of vegetation cover types within the Project area is presented in Table 3.2-1. Shrublands consist of sagebrush and rabbitbrush (*Chrysothamnus viscidiflorus* and *Ericameria nauseosa*). Rabbitbrush annual grasslands and sagebrush annual and perennial grasslands are common in the Project area. Annual grasses present in the Project area include field brome (*Bromus arvensis*) and cheatgrass (*Bromus tectorum*). Principal perennial grasses within the Project area include: crested wheatgrass (*Agropyron cristatum*), bluebunch wheatgrass (*Pseudoroegneria spicata*), Sandberg bluegrass (*Poa secunda*), Idaho fescue (*Festuca idahoensis*), squirreltail (*Elymus elymoides*) and Thurber's needlegrass (*Achnatherum thurberianum*). Less common vegetation types include intermittent stream/dry gully, riparian, and aspen (*Populus tremuloides*) communities. Shrub-steppe habitat is located primarily west of the Columbia River and agricultural development is located east of the Columbia River and south of the Saddle Mountains.

Very few riparian areas occur within the Project area (Table 3.2-1). The largest riparian and wetland areas consist of a band of riparian vegetation occurring along Lower Crab Creek and an aspen grove associated with an area that is seasonally moist. Much of the Lower Crab Creek riparian area is bordered by pastureland and disturbed, often grazed, shrub-steppe habitats. Within the Project area, the vegetation bordering Lower Crab Creek consists of dense thickets of peachleaf willow (*Salix amygdaloides*), narrowleaf willow (*Salix exigua*), Russian olive (*Elaeagnus angustifolia*), and black cottonwood (*Populus balsamifera* ssp. *trichocarpa*) trees. The understory in this area is variable, including native species, such as soft-stem bulrush (*Schoenoplectus tabernaemontani*) and common cattail (*Typha latifolia*), as well as a host of non-native species such as diffuse knapweed (*Centaurea diffusa*) and common reed (*Phragmites australis*). The majority of riparian areas within the Project area are seasonally moist uplands. These drier riparian areas are typically vegetated with upland shrubs, including sagebrush. For more information on water resources in the Project area, refer to Section 3.14 Water Resources.

Lands modified for agricultural use are prevalent in the Project area. Agricultural lands in the Project area are primarily used for cultivation of fruit trees, vineyards, and row crops. Livestock grazing occurs on both public and private lands. For more information on farming and grazing activities in the Project area, refer to Section 3.4 Land Jurisdiction and Land Use.

3.2.2.2 Noxious Weeds and Invasive Plant Species

Many exotic plant species are found within the Project area, but only a portion of these are designated as noxious weeds. Noxious weeds are non-native species that spread quickly, are difficult to control and cause ecological and economical damage (WSNWCB 2011). The Washington State Department of Agriculture maintains a list of noxious weeds to be controlled in Washington (WSNWCB 2011). Class A noxious weeds have limited distribution in the state and state law requires their eradication. Class B noxious weeds are either absent or have limited distribution throughout the state. The goal for Class B noxious weeds is to contain the infestations to their current locations and prevent their spread to new areas. Class C noxious weeds are already widespread in the state and counties can choose to either enforce control or can focus on educating residents about controlling these noxious weeds. In addition to the state designated noxious weed list, each County and District Noxious Weed Control Board can develop and enforce a list of weeds that are considered noxious in their county or district (WSNWCB 2011).

Within the Project area, qualified botanists conducted a complete, floristic pedestrian survey to target noxious weed species on accessible federal lands within the ROW corridor for each of the alternate route segments. Federal lands were considered inaccessible if there was restricted access on the JBLM YTC, access issues crossing private lands, dangerously steep terrain, and excessively long distances (i.e., greater than one mile) to hike from car to the ROW corridor. The noxious weed survey occurred June 22-29, 2011; any additional noxious weeds observed during the special status plant surveys (May 16-25 and August 8-10, 2011) were also documented. State and county-listed noxious weeds documented during the 2011 noxious weed survey are presented in Table 3.2-2.

Noxious weeds within the Project area are scattered and patchy in distribution, with the exception of kochia (*Bassia scoparia*) and Russian thistle (*Salsola iberica*) which were ubiquitous and often dominant in nature across most accessible federal lands. Many of the areas where noxious weeds were documented during the survey were associated with disturbance and vectors for weed establishment and spread. The larger infestations were primarily associated with roads, JBLM YTC's fire break, areas with past fire events and private landowner activities such as grazing and farming. Route Segment 3c had the largest number of Class B and C noxious weed species and occurrences, which were associated with irrigation canals and agricultural lands. Routes Segments 1a, 1b, 1c, and 3b also had a substantial number of noxious weed species. Routes Segments 2b and 2d had the fewest number of noxious weed species documented. The Noxious Weed Report is included in its entirety in Appendix B-4.

TABLE 3.2-1 SUMMARY OF VEGETATION COVER TYPES (ACRES) BY ROUTE SEGMENT

	ACRES WITHIN PROJECT AREA (ONE MILE FROM EITHER SIDE OF ROUTE SEGMENT CENTERLINES)									
VEGETATION COVER TYPE	**1a**	**1b**	**1c**	**2a**	**2b**	**2c**	**2d**	**3a**	**3b**	**3c**
Agriculture	570.8	495.1	1,107.1	132.7	3,358.4	10,627.1	40.4	0	885.4	11,182.5
Annual Grassland	3,166.7	8,342.3	8,957.4	2,140.2	4,528.6	7,061.9	60.1	42.0	435.0	6,472.8
Aspen	0	1.1	1.1	0	0	0	0	0	0	0
Developed/Disturbed	15.6	96.6	95.5	4.9	20.8	17.3	9.1	2.0	107.6	74.7
Intermittent Stream/Gully	1.0	13.6	13.6	3.5	11.2	14.4	4.5	0	1.25	0.3
Open Water/Canal	477.4	0	0	0	0	0.2	290.2	25.5	7,369.9	953.6
Perennial Grassland	144.5	3,688.2	3,399.3	184.0	1,152.3	411.8	503.6	2.2	3,907.8	2.9
Rabbitbrush/ Annual Grassland	0	15.1	15.1	0	0	0	0	0	8.9	40.1
Riparian	5.2	61.0	60.2	41.4	0	0	0.3	0	414.5	172.9
Rock/Basalt Cliff	0	0	0	0	1.2	0.3	5.3	0	20.6	8.3
Sagebrush/ Annual grassland	0	5.4	5.4	0	0	0.4	0	2.0	5.9	617.7
Sagebrush/ Perennial grassland	335.2	5,147.1	4,701.9	745.2	13,856.6	6,967.7	9,960.4	2,119.8	16,412.9	14,031.0
Tree	0.7	0.3	0.3	0	0	0	0.2	0	20.9	0.2
Total[1]	**4,717.1**	**17,865.8**	**18,356.9**	**3,251.9**	**22,929.1**	**25,101.1**	**10,874.1**	**2,193.5**	**29,590.7**	**33,557.0**

[1]Numbers are rounded and may not sum exactly.

TABLE 3.2-2 NOXIOUS WEEDS SPECIES DOCUMENTED IN PROJECT AREA

SPECIES NAME	LEGAL NOXIOUS STATUS[1,2,3,4]		LOCATION OF SPECIES (ROUTE SEGMENT)	TOTAL NUMBER OF OCCURRENCES	TOTAL ACRES[5,6,7]
	WASHINGTON	COUNTY			
Russian knapweed *Acroptilon repens*	Class B	G, K, Y	3b	3	2.0
Burningbush[5] *Bassia scoparia* (=*Kochia scoparia*)	Class B	G	1a, 1b, 1c, 3b, 3c		
Hoary cress *Cardaria draba*	Class C	G, K	1a, 1b	4	0.1
Diffuse knapweed *Centaurea diffusa*	Class B	G, K, Y	1a, 1b, 1c, 2b, 3b, 3c	32	50.3
Rush skeletonweed *Chondrilla juncea*	Class B	G, K, Y	3c	1	0.0
Canada thistle *Cirsium arvense*	Class C	G, K	1a, 1b, 3b, 3c	9	2.4
Field bindweed *Convolvulus arvensis*	Class C	G, K	2b, 3b	4	0.0
Horseweed[6] *Conyza canadensis*		K	3c	1	48.5
Common St. Johnswort *Hypericum perforatum*	Class C	G	3b	1	12.6
Common catsear[6] *Hypochaeris radicata*	Class B	G, K	3c	1	3.2
Perennial pepperweed *Lepidium latifolium*	Class B	G, K, Y	1b, 1c, 3c	11	0.8
Dalmatian toadflax *Linaria dalmatica* ssp. *dalmatica*	Class B	G, K, Y	1a	2	2.5
Purple loosestrife *Lythrum salicaria*	Class B	G, K, Y	3c	1	0.0
Scotch thistle *Onopordum acanthium*	Class B	G, K, Y	1b, 1c, 3b, 3c	8	0.2
Reed canarygrass *Phalaris arundinacea*	Class C		3c	2	1.6
Common reed (nonnative genotype) *Phragmites australis*	Class B	G	3c	1	0.1
Russian thistle[5] *Salsola iberica (=S. kali)*	Class C	K	1a, 1b, 1c, 2b, 2d, 3b, 3c		
Cereal rye *Secale cereale*	Class C	G	3c	1	0.1
Groundsel[6] *Senecio vulgaris*	Class C	G	3c	2	2.1
Puncturevine[6] *Tribulus terrestris*	Class B	G, K, Y	1a, 3c	9	66.1

Sources: [1]Whitson et al. 1999, [2]Noxious Weed Control Board of Grant County 2011, [3]Kittitas County Noxious Weed Control Board, [4]Yakima County Noxious Weed Board; State of Washington Noxious Weed Designations: **Class A** – have a limited distribution in Washington. State law requires that these weeds be eradicated; **Class B** - are either absent from or limited in distribution in some portions of the state but very abundant in other areas. The goals are to contain the plants where they are already widespread and prevent their spread into new areas; **Class C** – are already widespread in Washington State. Counties can choose to enforce control, or they can educate residents about controlling these noxious weeds (WSNWCB 2011); County Noxious Weed Lists: B=Benton; G=Grant; K=Kittitas; Y=Yakima. [5]Burningbush and Russian thistle were not mapped due to their ubiquitous and often dominant nature across most accessible federal lands. [6]Horseweed, common cat's-ear, groundsel, and puncturevine were not determined to be noxious until after the surveys were complete. Information is based on notes and retrospective mapping. [7]Acreages are approximate and include a buffer, where appropriate.

Several invasive plant species that do not have designation as a noxious weed were also found within the Project area, the most prevalent was cheatgrass. Cheatgrass is an invasive annual grass native to Western Europe that can significantly alter native sagebrush steppe communities through competition and an increase in wildland fire frequency (Billings 1994). In some locations, cheatgrass can become so dense that few perennial grasses or shrub species are present (Mosley et al. 1999). Refer to Section 3.12, Wildland Fire Ecology and Management, for more information on cheatgrass and fire cycles.

3.2.2.3 Special Status Plant Species

Special status plant species for this analysis includes plant species currently listed under the federal Endangered Species Act (ESA) as threatened or endangered and species proposed for federal listing as threatened or endangered. It also includes species listed by the U.S. Fish and Wildlife Service (USFWS) as candidates for federal listing under the ESA, and species designated as federal species of concern. Candidate species receive no statutory protection under the ESA; however the USFWS encourages cooperative conservation efforts for these species because they are, by definition, species that may warrant future protection under the ESA. Federal species of concern are species that may be rare or declining, but are not formally listed under the ESA. Additionally, special status plant species also include those species listed by Washington State as endangered, threatened or sensitive, and Bureau of Land Management (BLM) designated sensitive species for the State of Washington. The designation of 'special status plant species' in this document refers to any plant species currently included on any of these lists.

The special status plant species list was developed by compiling a list of all special status species known to Benton, Grant, Kittitas, and Yakima counties, Washington state threatened and endangered species, data accessed from JBLM YTC, the WNHP (2010), BLM (ISSSSP 2008; ISSSSP 2011; Boyter 2011), and USFWS threatened, endangered, candidate, and species of concern. The list was further refined by evaluating known occurrences, habitat requirements, elevation and availability of suitable habitat within the Project area. Sixty-eight special status plant species were identified as occurring or having the potential to occur within the Project area. The comprehensive list of special status plant species for the Project area is included in Appendix B-3 (Special Status Plants Report).

Qualified botanists conducted a complete, floristic pedestrian survey for the targeted special status plants on accessible federal lands within the 160 foot ROW corridor. Federal lands comprise approximately 29 percent of the total ROW corridor; the remaining 71 percent is comprised of non-federal (e.g., state and private) land and was not surveyed. Of the 674 acres of federal lands within the 160 feet wide ROW corridor, 450 acres (67 percent) were accessible and surveyed. A series of three surveys were conducted (May, June, and August 2011) within the 450 acres of accessible federal land to address the different phenology (timing of flowering and/or fruiting) of the target special status plant species. Appendix B-3 (Special Status Plants Report) lists each species' phenology and the targeted survey month. The May and June surveys took place in all habitats within accessible federal lands and the August survey took place only at wetland and riparian areas along accessible federal lands. The May and June surveys assisted in the identification of wetland and riparian habitats to be targeted for the final survey in August. The remaining 224 acres of federal lands that were not surveyed and were considered inaccessible due to: restricted access on the JBLM YTC; access issues crossing private lands; dangerously steep terrain; and excessively long distances (greater than one mile) to hike from car to the ROW corridor. Table 3.2-3 presents a summary of the total amount of land present within the 160 foot ROW corridor compared with the amount of land surveyed for special status plants.

TABLE 3.2-3 TOTAL AMOUNT OF FEDERAL LAND SURVEYED COMPARED WITH THE TOTAL AMOUNT OF FEDERAL AND NON-FEDERAL LAND PRESENT WITHIN THE 160 FOOT ROW CORRIDOR

ROUTE SEGMENT	TOTAL ACRES	FEDERAL LAND		NON-FEDERAL LAND (ACRES)	PERCENT SURVEYED (FEDERAL AND NON-FEDERAL LAND)
		TOTAL ACRES	AMOUNT SURVEYED (ACRES AND %)		
1a	43.9	4.5	4.5 (100%)	39.4	10%
1b	243.8	241.9	138.2 (57%)	1.9	57%
1c	251.3	1.7	1.7 (100%)	249.6	1%
2a	19.3	0	0	19.3	0%
2b	317.5	50.6	43 (85%)	266.9	14%
2c	351.7	0.2	0.1 (50%)	351.5	<1%
2d	137.0	19.7	19.7 (100%)	117.3	14%
3a	3.3	0	0	3.3	0%
3b	422.1	171.5	61.1 (36%)	250.6	14%
3c	489.7	181.0	179.8 (99%)	308.7	37%

No known federally-listed plant species occur within the Project area; however five species listed as endangered, threatened, or candidate are suspected to occur within the Project area. More information on these species is provided in Table 3.2-4. No plant species within the Project area (Benton, Grant, Kittitas, and Yakima Counties) are proposed for listing under the ESA (USFWS 2012). In addition, no proposed or designated critical habitat is present within or adjacent to the Project area (USFWS 2012).

In addition to federally-listed plant species, twenty-two state-listed and BLM Sensitive plant species are known to occur within the Project area. Table 3.2-5 presents a summary of these species and the location of the closest route segment. Four special status plant species were located during the special status plant surveys: caespitose evening-primrose (*Oenothera caespitosa* ssp. *caespitosa*), Columbia milkvetch (*Astragalus columbianus*), hedgehog cactus (*Pediocactus simpsonii var. robustior*) and Nuttall's sandwort (*Minuartia nuttallii* var. *fragilis*). Information on these species is presented in Table 3.2-5 and discussed in more detail below. All occurrences were located during the May survey, but some were confirmed and expanded during the June survey. Hedgehog cactus was added to the BLM Oregon/Washington Sensitive plant species list December 21, 2011, following completion of the surveys (ISSSSP 2011). Hedgehog cactus was located during the May and June surveys and, as it was not on the BLM Sensitive plant species list at the time of the surveys, its mapped location is based on field notes and retrospective mapping. None of the five species listed as endangered, threatened, or candidate were located during the surveys (Appendix B-3 Special Status Plants Report).

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TABLE 3.2-4 FEDERALLY LISTED SPECIES SUSPECTED TO OCCUR WITHIN THE PROJECT AREA

COMMON NAME	SCIENTIFIC NAME	STATUS[1]	RANGE	GLOBAL/STATE RARITY OF SPECIES[2]	REGIONAL RARITY OF SPECIES[3]	PRIMARY THREATS/RESPONSE TO DISTURBANCE	REQUIRED HABITAT	PHENOLOGY	POTENTIAL TO OCCUR IN PROJECT AREA
Umtanum desert buckwheat	*Eriogonum codium*	C, WE	The entire known range of Umtanum desert buckwheat is on federally owned land in the Hanford National Monument, Washington. Other potential locations within the lower Columbia River Basin were intensively searched for additional populations of *E. codium* in 1996 and 1997, however no other populations were found.	G1/S1	One population occupying approximately 489 acres is known to occur within region.	Umtanum desert buckwheat does not appear to be fire adapted. A human-caused fire destroyed 10 to 20 percent of the one known population in 1996. Other potential threats include off-highway vehicle (OHV) use. The individual plants are long-lived with low seed germination rates and high seedling mortality.	Flat to gently sloping microsites near the top of the steep, north-facing basalt cliffs near salt scrub habitats overlooking the Columbia River; restricted to the exposed top of the basalt Lolo Flow. Assoc. include spiny hopsage and cheatgrass; 1,100-1,320 feet.	May to late-August	Low; one known population exists and appears to be restricted to the exposed top of one particular basalt flow (the Lolo flow). Not documented in surveys.
Ute ladies'-tresses	*Spiranthes diluvialis*	T, WE	Ute ladies'-tresses occurs in Colorado, Idaho, Montana, Nebraska, Nevada, Utah, Washington, and Wyoming.	G2G3/S1	Not known to occur within the Upper Columbia and Yakima Basins.	The riparian habitat on which Ute ladies'-tresses depends has been drastically modified by urbanization and agriculture and development. Habitat loss or degradation from competition from non-native plants and vegetation succession are the most widespread threats.	Moist meadow habitats along floodplains, oxbows, and stream and river terraces; subirrigated or spring-fed abandoned stream channels and valleys; and lakeshores; specifically, swales, narrow meander channels, and similar wetland and riparian habitats in valley bottom landscapes that retain moisture through late-summer.	mid-July to August	Low to moderate; limited potential habitat in the Project area. Not documented in surveys.
Wenatchee Mountain checker-mallow	*Sidalcea oregana* var. *calva*	E, WE	The known historical and current range of Wenatchee Mountain checker-mallow is restricted to Chelan County, Washington. The historical range covered an area approximately 11 by 3 miles, and extended southeast of Leavenworth, Washington. Only five existing populations are known to occur.	G5/S1	Two populations occupying approximately 326 acres are known to occur within the region.	Wenatchee Mountain checker-mallow plants are subject to high levels of seed predation by weevils and other insects. Primary threats include hydrological disturbance, ground disturbance associated with timber harvest, development and agriculture, competition from non-native grasses, fire, infestation by aphids, and predation by livestock.	Populations are generally found in wetter portions of open forest-moist meadow habitats. May also be found in open conifer forests dominated by *Pinus ponderosa* (ponderosa pine) and *Pseudotsuga menziesii* (Douglas-fir), on the perimeter of shrub and hardwood thickets dominated by quaking aspen (*Populus tremuloides*), along permanent or intermittent streams in sparsely forested draws, and near seeps, springs, or small drainages. 1,900-3,200 feet.	May to June	Low; outside known range. Limited available habitat. Not documented in surveys.
White Bluffs bladderpod	*Physaria douglasii* ssp. *tuplashensis*	C, WT	Only one population is known to occur. This population is along the upper edge of the White Bluffs of the Columbia River in Franklin County, Washington.	G2/S2	One population occupying approximately 4,851 acres is known to occur within the region.	Primary threats include groundwater movement from adjacent, up-slope agricultural activities causing landslides in the White Bluffs; an infestation of yellow starthistle (*Centaurea solstitialis*), a nonnative weed; off-road vehicles; and wildland fire.	Found growing on dry, barren, nearly vertical exposures of calcium carbonate soil (high pH). Associated species include buckwheat milkvetch (*Astragalus caricinus*), Geyer's milkvetch (*Astragalus geyeri*), desert dodder (*Cuscuta denticulata*), dwarf-evening primrose (*Camissonia pygmaea*), and Sandberg bluegrass (*Poa secunda*). The elevation ranges from 780 to 890 feet (150-290 meters).	June to July	Low; limited habitat potential. Species is restricted to a very small area along the Columbia River and outside the Project area. Not documented in surveys.

COMMON NAME	SCIENTIFIC NAME	STATUS[1]	RANGE	GLOBAL/STATE RARITY OF SPECIES[2]	REGIONAL RARITY OF SPECIES[3]	PRIMARY THREATS/RESPONSE TO DISTURBANCE	REQUIRED HABITAT	PHENOLOGY	POTENTIAL TO OCCUR IN PROJECT AREA
Wormskiold's northern wormwood	*Artemisia borealis* var. *wormskioldii*	C, BLM-S, WE	There are only two known existing occurrences of Wormskiold's northern wormwood. These occurrences are located approximately 202 river miles apart along the Columbia River in Washington.	G5/S1	One population occupying approximately 276 acres is known to occur within the region.	Primary threats include altered water regimes, erosion, trampling, off-road vehicle compaction, and exotic species invasions. Historically known populations and suitable habitat in Washington and in Oregon have been lost due to dam construction.	Restricted to exposed basalt, cobbly-sandy terraces, and sand habitat along the banks of the Columbia River. Elevation ranges from 160 to 500 feet (50-150 meters).	April to May	Moderate to high; however suitable habitat is limited. Not documented in surveys but known to occur within 1 mile of Route Segments 3b and 3c.

Sources: BLM 2007, USFWS 2011, USFWS 2010a,b,c, USFWS 2004a, USFWS 1995, Hitchcock et al. 1969, Hitchcock and Cronquist 1973, NatureServe 2011, WNHP and BLM 2005, WNHP 2010, Camp and Gamon 2011, and CPC 2010a,b. [1]Key: E – Federal Endangered; T – Federal Threatened; C – Federal Candidate; BLM-S – BLM Washington Sensitive; WE – Washington State Endangered; WT – Washington State Threatened. [2]NatureServe Rankings: G1-critically imperiled; G2-imperiled; G3-vulnerable; G5-secure; S1- critically imperiled; S2-imperiled. [3]The Yakima and Upper Columbia River Basins watershed data was used to provide regional context information.

TABLE 3.2-5 STATE-LISTED AND BLM SENSITIVE SPECIES KNOWN TO OCCUR AND DOCUMENTED WITHIN THE PROJECT AREA

COMMON NAME	SCIENTIFIC NAME	STATUS[1]	RANGE	GLOBAL/STATE RARITY OF SPECIES[2]	REGIONAL RARITY OF SPECIES[3]	PRIMARY THREATS/RESPONSE TO DISTURBANCE	REQUIRED HABITAT	PHENOLOGY	ROUTE SEGMENT(S) LOCATED WITHIN 1 MILE OF KNOWN OCCURRENCE	DOCUMENTED DURING PLANT SURVEY (ROUTE SEGMENT)
Awned halfchaff sedge	*Lipocarpha aristulata*	BLM-S,WT	This species is found from California north to Washington and west to Idaho, Wyoming, Utah, Arizona, Colorado, New Mexico, Kansas, Oklahoma, Texas, Minnesota, Iowa, Missouri, and Indiana. In Washington, awned halfchaff sedge is known from two recent occurrences along the Columbia River in Benton, Grant, and Franklin counties and five historical occurrences from Klickitat, Whitman, Benton, and Asotin counties.	G5?/S1	Two populations occupying approximately 2,718 acres are known to occur within the region.	The current primary threat is hydrologic change.	Wetlands along the Columbia River, wet soil and mud in bottomlands; sandbars and beaches; 328-1,312 feet.	June to September	2d, 3b, 3c	
Beaked cryptantha	*Cryptantha rostellata*	BLM-S, WT	Beaked cryptantha is known from Kittitas County, Washington south through Oregon to central California. In Washington, it is currently known in Asotin, Kittitas and Klickitat counties in the Columbia Basin physiographic province. Historically it was also known from Yakima and Walla Walla Counties.	G4/S2	Six populations occupying approximately 817 acres are known to occur within the region.	Primary threats include grazing, erosion, and invasion of habitat by exotic species.	Dry, open places; Most locations are within big sagebrush/bluebunch wheatgrass (*Artemisia tridentata/Pseudoroegneria spicata*) habitat types; however some occur within scabland sagebrush/Sandberg bluegrass (*Artemisia rigida*/*Poa secunda*) habitats; 600-2,900 feet.	April to June	3b	
Beaked spike-rush	*Eleocharis rostellata*	WS	Beaked spike-rush is known from Vancouver Island to Nova Scotia, Canada south to northern Mexico and the greater Antilles, and in the South American Andes. In Washington, beaked spike-rush is currently known from Grant and Yakima counties.	G5/S2	Six populations occupying approximately 563 acres are known to occur within the region.	The primary threat is invasion of habitat by exotic species and increasing density of woody species.	Marshes and boggy sites around lakes, in alkaline or highly calcareous areas, often around hot springs; also in coastal salt marshes; 500-1850 ft.	June to September	3a, 3b, 3c	

COMMON NAME	SCIENTIFIC NAME	STATUS[1]	RANGE	GLOBAL/STATE RARITY OF SPECIES[2]	REGIONAL RARITY OF SPECIES[3]	PRIMARY THREATS/RESPONSE TO DISTURBANCE	REQUIRED HABITAT	PHENOLOGY	ROUTE SEGMENT(S) LOCATED WITHIN 1 MILE OF KNOWN OCCURRENCE	DOCUMENTED DURING PLANT SURVEY (ROUTE SEGMENT)
Bristle-flowered collomia	*Collomia macrocalyx*	BLM-S, WS	Bristle-flowered collomia occurs from north-central Oregon into central Washington. In Washington, it is known from Kittitas and Yakima counties in the Columbia Basin physiographic province.	G3G4/S1	Nine populations occupying approximately 869 acres are known to occur within the region.	The primary threat to the species is invasion of habitat by non-native species, in particular cheatgrass. Other threats include grazing, off-road vehicle use, and military training.	Dry, open places at lower elevations; sparsely vegetated and associated with sagebrush steppe; a cryptogram crust is present on the rocks and soil; early spring, flowers ephemeral; 850-2,100 feet.	April to May	3b	
Caespitose evening-primrose	*Oenothera caespitosa* ssp. *caespitosa*	BLM-S, WS	Caespitose evening primrose is known from eastern Oregon eastward, through Montana and Wyoming, to the Dakotas. In Washington, it occurs in Kittitas, Yakima, Grant, and Benton counties in the Columbia Basin physiographic province.	G5/S2	Nine populations, occupying approximately 1,737 acres are known to occur in the region.	Primary threats to Caespitose evening primrose include habitat disturbance by grazing, road construction and maintenance, land conversion, and mineral extraction. The occurrences in Washington are located in areas that have undergone, or are undergoing, natural and human-caused disturbances, and in areas with no evidence of disturbance. The degree to which it may require some level of disturbance is unclear.	Talus slopes, road cuts, and dry hills; as well as along the flat river terrace of the Columbia River; associated with sagebrush (*Artemisia tridentata* or *Artemisia rigida*); 400-1,200 feet.	June to August	3b, 3c	3b
Columbia cress	*Rorippa columbiae*	SOC, BLM-S, WE	Columbia cress is endemic to Washington, Oregon, and California, currently found in two separated regions: along the Columbia River in Washington and Oregon, and in south-central Oregon and northern California. In Washington, it is known from two segments of the Columbia River: the arid Hanford Reach in the Columbia Basin, and the Lower Columbia Reach within the Columbia Gorge.	G3/S1S2	One population occupying approximately 13,679 acres is known to occur within the region.	Short-term inundation during the growing season may depress the vigor of the species over the long-term. In addition, current management of the Columbia River appears to affect the ability of the species to successfully produce seeds. Woody vegetation may alter the community structure of the species' habitat. Columbia cress appears to be adapted to periodic catastrophic flooding and unstable substrates typical of riparian areas, which appear to help maintain the species' habitat by limiting siltation and decreasing competition.	Moist, sandy or cobbly soil, such as river floodplains and ephemeral ponds. Associated with the Columbia River, snow -fed streams and lakes, wet meadows, irrigation ditches and roadside ditches; apparently requires wet soil throughout the growing season.	July to October	3c	
Columbia milkvetch	*Astragalus columbianus*	SOC, BLM-S, WS	Restricted to an area approximately 25 miles by 5 miles along the west side of the Columbia River in Yakima, Kittitas, and Benton counties, Washington.	G3/S3	Nineteen populations occupying approximately 34,579 acres are known to occur within the region.	Primary threats are the continued degradation of habitat by military training activities and livestock grazing and increased competition by exotic invasive species. Orchard development has also resulted in recent losses of habitat and populations. Columbia milkvetch increases in numbers following low intensity fires. Erosion events, such as along dirt roads, can also create suitable habitat for colonization; however, it does not use these disturbed habitats to expand its range.	Dry often sandy places with sparse vegetation usually on slopes but sometimes on flats; associated with shrub-steppe vegetation zone; 500-2,100 feet.	March to May	2b, 2c, 2d, 3b, 3c	2b, 2d, 3b

COMMON NAME	SCIENTIFIC NAME	STATUS[1]	RANGE	GLOBAL/STATE RARITY OF SPECIES[2]	REGIONAL RARITY OF SPECIES[3]	PRIMARY THREATS/RESPONSE TO DISTURBANCE	REQUIRED HABITAT	PHENOLOGY	ROUTE SEGMENT(S) LOCATED WITHIN 1 MILE OF KNOWN OCCURRENCE	DOCUMENTED DURING PLANT SURVEY (ROUTE SEGMENT)
Dwarf evening-primrose	*Camissonia pygmaea*	BLM-S, WS	Regional endemic known from eastern Washington (Benton, Douglas, Franklin, Grant, and Kittitas counties), eastern Oregon (Gilliam, Grant, Harney, and Wheeler counties), and Idaho (Jerome County).	G3/S3	Nineteen populations occupying approximately 6,564 acres are known to occur within the region.	Primary threats to dwarf evening-primrose include resource extraction (gravel pits), road construction and herbicide drift. Invasion by non-native weedy species will likely pose a threat in the future. Illegal off-road vehicle use and off-site irrigation. Dwarf evening primrose occurs in habitats that are maintained in an open condition by erosion and the generally harsh environment. Due to the unstable nature of the habitat and the annual life cycle, it is likely that the number, size and location of the populations vary from year to year.	Sagebrush and lower foothills; unstable soil or gravel in steep talus slopes, dry washes, banks and roadcuts; growing with big sagebrush and wild buckwheat.	May to July	3b	
Fuzzytongue penstemon	*Penstemon eriantherus var. whitedii*	BLM-S, WS	Fuzzytongue penstemon is endemic to Washington and is found in Franklin, Chelan, Kittitas, Douglas, Klickitat and Lincoln counties, Washington.	G4/S2	Eight populations occupying approximately 3,335 acres are known to occur within the region.	Primary threats include grazing and off-road vehicle use. Some existing populations occur on private land, and in one instance, is in an area heavily used for agriculture.	Dry, open places in between shrubs; in the plains, valleys, and foothills, sometimes ascending to moderate elevations in the mountains; associated with big sagebrush (*Artemisia tridentata*), antelope bitterbrush (*Purshia tridentata*), purple sage (*Salvia dorrii*), buckwheat (*Eriogonum* sp.), and rabbitbrush *Chysothamnus nauseosus*); 525-3,835 feet.	May to June	3c	
Geyer's milk-vetch	*Astragalus geyeri*	BLM-S, WT	Geyer's milk-vetch is known from southeast Oregon to California and Nevada, and eastward through southern Idaho to Wyoming and Utah, and Grant County, Washington.	G4/S1	Eight populations occupying approximately 1,689 acres are known to occur within the region.	Primary threats include agricultural conversion, off-road vehicles, and grazing.	Arid sandy soils, flat to dunes; sandy desert, especially on dunes; 630-670 feet.	April to July	3a, 3b, 3c	
Grand redstem	*Ammannia robusta*	BLM-S, WT	Grand redstem is found from central western Canada down to California and from central United States to Mexico. In Washington, it is found in Benton, Grant and Franklin counties and was historically known from Klickitat and Whitman counties along the Columbia and Snake Rivers.	G5/S1	Two populations occupying approximately 2,299 acres are known to occur within the region.	Grand redstem is vulnerable to hydrologic changes, such as flooding by hydroelectric developments and invasion by exotic species, such as purple loosestrife (*Lythrum salicaria*). Its habitat type was once widely distributed along the Columbia and Snake rivers, but inundation due to hydroelectric development has dramatically reduced the extent and quality of these wetlands.	Moist, heavy soil around ponds, rivers, and other wet places; deep sandy loam to gravelly soils. Along the Columbia River in riparian mudflat wetlands dominated by annual species.	May to July	3b	

COMMON NAME	SCIENTIFIC NAME	STATUS[1]	RANGE	GLOBAL/STATE RARITY OF SPECIES[2]	REGIONAL RARITY OF SPECIES[3]	PRIMARY THREATS/RESPONSE TO DISTURBANCE	REQUIRED HABITAT	PHENOLOGY	ROUTE SEGMENT(S) LOCATED WITHIN 1 MILE OF KNOWN OCCURRENCE	DOCUMENTED DURING PLANT SURVEY (ROUTE SEGMENT)
Gray cryptantha	*Cryptantha leucophaea*	SOC, BLM-S, WS	Gray cryptantha is a regional endemic in the Columbia and Lower Yakima Rivers in the Western Columbia Basin. It occurs from Wenatchee, Washington to The Dalles, Oregon. In Washington, it is currently known from Benton, Franklin, Grant, Kittitas, Walla Walla, and Yakima counties and historically Douglas County.	G2G3/S2S3	Thirty-three populations occupying approximately 16,169 acres are known to occur within the region.	Primary threats include off-road vehicle use and increased weed invasions. Changes in sand deposition and agricultural conversion also pose threats. Gray cryptantha restricted primarily to sand dunes that are not completely stabilized, i.e., areas where there is still some movement of sand.	Dry, often sandy places; with sparse vegetation, usually on slopes but sometimes on flats; near the Columbia and lower Yakima rivers; 300-2,500 feet.	April to May	2d, 3b, 3c	
Great Basin gilia	*Aliciella leptomeria*	WT	Great Basin gilia is distributed throughout the Great Basin from California to Oregon, Idaho, New Mexico and Colorado. In Washington, the documented occurrences in Grant, Benton, and Franklin counties are several hundred miles north of previously known ranges.	G5/S1	Eight populations occupying approximately 1,320 acres are known to occur within the region.	Several of the known populations are within portions of the Hanford Reach National Monument are open to the public and could be affected by recreational use. Great Basin gilia populations are also vulnerable to ground disturbance and weedy species.	Open sandy or rocky areas; dry open places at low elevations, especially in sandy or sandy soil, gravelly bluffs, and on caliche; associated with sagebrush steppe; 470-6,890 feet.	Mid May to June	3a, 3b, 3c	
Hedgehog cactus*	*Pediocactus simpsonii var. robustior*	BLM-STR, WS	Hedgehog cactus ranges from eastern Washington to Nevada. In Washington, it has been found in Yakima, Kittitas, Chelan, Douglas, and Grant counties.	G4/S2	Fourteen populations occupying approximately 11,895 acres are known to occur within the region.	The primary threat to hedgehog cactus is collecting by cactus collectors.	Thin, rocky soil on ridge tops, desert valleys, and low mountains; found at elevations from 1,000 to 4,000 feet in Washington; associated with scabland sagebrush (*Artemisia rigida*).	May to August		1b
Hoover's desert-parsley	*Lomatium tuberosum*	SOC, BLM-S, WS	Hoover's desert-parsley is endemic to Washington and is known only from Yakima County and adjacent portions of Benton, Grant, and Kittitas counties.	G2G3/S2S3	Twenty two populations occupying approximately 13,210 acres are known to occur within the region.	Primary threats include gravel extraction, road construction, military training activities, and grazing. Herbicide drift from nearby agricultural lands and noxious weed establishment may also pose threats. The environment of Hoover's desert-parsley is quite harsh (hot, dry and rocky) and loose and unstable. These factors tend to eliminate most of the competition from other vegetation.	Loose rocky slopes and basalt drainage channels; rocky hillsides; 600-2,300 feet.	March to May	3b, 3c	
Hoover's tauschia	*Tauschia hooveri*	SOC, BLM-S, WT	Hoover's tauschia is a regional endemic, extending from Toppenish Ridge in south central Yakima County, northward to the southeastern foothills of the Wenatchee Mountains in east-central Kittitas County.	G2/S2	Twenty-eight populations occupying approximately 13,911 acres are known to occur within the region.	Orchard expansion and housing development may result in some degradation or loss of habitat. Herbicide spray drift may affect some populations. Grazing, off-road vehicle use and road construction are also potential threats. The Hoover's tauschia sites generally do not have enough vegetation present to carry a fire.	Sagebrush scablands, often barren rocky clay.	March to May	1b, 1c	

COMMON NAME	SCIENTIFIC NAME	STATUS[1]	RANGE	GLOBAL/STATE RARITY OF SPECIES[2]	REGIONAL RARITY OF SPECIES[3]	PRIMARY THREATS/RESPONSE TO DISTURBANCE	REQUIRED HABITAT	PHENOLOGY	ROUTE SEGMENT(S) LOCATED WITHIN 1 MILE OF KNOWN OCCURRENCE	DOCUMENTED DURING PLANT SURVEY (ROUTE SEGMENT)
Kalm's lobelia	*Lobelia kalmii*	WE	Kalm's lobelia occurs from Newfoundland to Pennsylvania, west to British Columbia, and Colorado to Hudson Bay and the southern Mackenzie District. In Washington, it occurs in Yakima County.	G5/S1	One population occupying approximately 92 acres is known to occur within the region.	Primary threats include habitat degradation from livestock, weedy species, and the sustainability of the habitat is dependent upon the steady flow of the natural spring. This species can apparently occur in a wide range of wetland types, including sphagnum bogs, stream and lake shores, wet meadows, and seeps and springs. The existing site in Yakima County has been degraded from past livestock use.	Marl or peat bogs, along shores and in other wet places.	Late July to August	3b	
Naked-stemmed evening-primrose	*Camissonia scapoidea ssp. scapoidea*	BLM-S, WS	Naked-stemmed evening-primrose occurs from eastern Oregon and Washington through southern Idaho to Wyoming, south to Colorado. In Washington, it is known only from Kittitas County.	G5/S1	Two populations occupying approximately 229 acres are known to occur within the region.	Primary threats include gravel extraction, invasion by weedy species, and military training activities. Naked-stemmed evening-primrose is apparently adapted to some disturbance since it occurs on a sandy unstable substrate.	Mostly in the sagebrush desert; especially on rocky or sandy soil; 600-900 feet.	May to July	3b	
Nuttall's sandwort	*Minuartia nuttallii* ssp. *fragilis*	BLM-S, WT	Nuttall's sandwort is found in Washington, Oregon, California and Nevada. In Washington, it is known to occur in Grant County.	G5/S1	Two populations occupying approximately 884 acres are known to occur within the region.	The primary threat is off-road vehicle use.	Dry basalt scree slopes, open, gravelly benches, or limestone talus from open sagebrush hills to alpine slopes; 5,413-7,874 feet.	April to May (August)	3b, 3c	1b, 3b
Piper's daisy	*Erigeron piperianus*	BLM-S, WS	Piper's daisy is a regional endemic, occurring only in the Columbia Basin of Washington. It has been found recently in Adams, Benton, Douglas, Franklin, Grant, Klickitat, and Yakima counties and historically in Kittitas County.	G3/S3	Forty-two populations occupying approximately 23,158 acres are known to occur within the region.	The primary threats to Piper's daisy include habitat loss due to agricultural development, overgrazing and weedy annual plants. Piper's daisy is most common in undisturbed areas of the sagebrush steppe; however, it has also been reported growing in grazed and burned sites, so can withstand some disturbance.	Dry, open places, often among sagebrush; 400-2,250 feet.	May to June	3c	
Snake River cryptantha	*Cryptantha spiculifera*	BLM-S, WS	Snake River cryptantha is a regional endemic, known from central Washington and eastern Oregon to northeastern California and northern Nevada, east through the Snake River Plains of Idaho, and western Montana. In Washington, it has been in the Okanogan Highlands, Eastern Cascades and Columbia Basin physiographic provinces.	G4?/S2?	Nine populations occupying approximately 7,193 acres are known to occur within the region.	Primary threats include agricultural conversion, grazing, off-road vehicle use, and irrigation related groundwater changes.	Sandy knolls and badlands and talus at low elevations; dry, open, flat or sloping areas in stable or stony soils.	April to July	3c	
Wanapum crazyweed	*Oxytropis campestris var. wanapum*	SOC, BLM-S, WE	Wanapum crazyweed is known only from Saddle Mountain, Grant County, Washington in the Columbia Basin physiographic province.	G5/S1	One population occupying approximately 1,919 acres is known to occur within the region.	Primary threats include past and potential future land uses include grazing, off-road vehicle use, mineral and gas exploration, and rock hounding. Very little is known about the ecology of Wanapum crazyweed. It occurs in a harsh environment where mature individuals probably face little competition from other vegetation.	Gravelly floodplains of the Columbia River; big sagebrush/bluebunch wheatgrass.	May to June	3c	

COMMON NAME	SCIENTIFIC NAME	STATUS[1]	RANGE	GLOBAL/STATE RARITY OF SPECIES[2]	REGIONAL RARITY OF SPECIES[3]	PRIMARY THREATS/RESPONSE TO DISTURBANCE	REQUIRED HABITAT	PHENOLOGY	ROUTE SEGMENT(S) LOCATED WITHIN 1 MILE OF KNOWN OCCURRENCE	DOCUMENTED DURING PLANT SURVEY (ROUTE SEGMENT)
White eatonella	*Eatonella nivea*	BLM-S, WT	White eatonella is known from the Great Basin, southeast Oregon, western Nevada and Washington. In Washington, it occurs in Grant and Kittitas counties.	G4G5/S1	Seven populations occupying approximately 853 acres are known to occur within the region.	Primary threats include trampling and disturbance to the substrate by domestic livestock, gravel extraction, disturbance from recreationalists (rock climbers, bicyclers and off-road vehicle uses), disturbance from activities associated with military training, and invasion by exotic species. Its habitat appears to suggest that it is a poor competitor with other vegetation.	Dry, sandy desert or volcanic areas; populations are on bare soil in sparsely vegetated sagebrush steppe, associated with other annuals.	April to May	3b	

Sources: BLM 2007, USFWS 2010a, Hitchcock et al. 1969, Hitchcock and Cronquist 1973, WNHP and BLM 2005, WNHP 2010, and Camp and Gamon 2011. [1]Key: SOC – Federal Species of Concern; BLM-S – BLM Washington Sensitive; BLM-C – BLM Washington Candidate; BLM-STR – BLM Washington Strategic; WE – Washington State Endangered; WT – Washington State Threatened; WC – Washington State Candidate, WS – Washington State Sensitive; WR – Washington State Rare; WM – Washington State Monitor; WR1 – Washington State review group 1; and WX – Washington State possibly extinct or extirpated. [2]NatureServe Rankings: G1-critically imperiled; G2-imperiled; G3-vulnerable; G4-apparently secure; G5-secure; S1- critically imperiled; S2-imperiled; S3-vulnerable. *Hedgehog cactus (*Pediocactus simpsonii var. robustior*) was not determined to be a special status plant until after the surveys were complete, therefore its mapped location is based on field notes and retrospective mapping.[3]The Yakima and Upper Columbia River Basins watershed data was used to provide regional context information.

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As not all land within the 160 foot ROW corridor were surveyed, additional special status species and populations could occur within the Project area. For each route segment, habitat suitability for special status plants was estimated using vegetation cover types documented during the special status plant surveys and aerial interpretation for non-federal lands and federal lands that were inaccessible during the surveys. Data sources for aerial interpretation included 2001 JBLM YTC vegetation data (JBLM YTC 2002), GAP data, and fire history data. Unsuitable habitat included: agricultural land; developed, road, or firebreak; irrigation canal; open water; and watered poplar. Marginal habitat included: annual grassland, perennial grassland; rabbitbrush/annual grassland, and sagebrush annual grassland. Suitable habitat included: basalt cliff/rock, sagebrush/perennial grassland, aspen, intermittent stream or dry gully, and riparian. Table 3.2-6 presents a summary of habitat suitability by route segment.

TABLE 3.2-6 SPECIAL STATUS PLANT SPECIES LOCATIONS AND HABITAT SUITABILITY BY ROUTE SEGMENT

ROUTE SEGMENT	SPECIAL STATUS PLANTS DOCUMENTED	HABITAT SUITABILITY[1] (ACRES)		
		SUITABLE HABITAT	MARGINAL HABITAT	UNSUITABLE HABITAT
1a	none	8.1 acres -predominately sagebrush/perennial grassland, with some intermittent stream/dry gully.	22.3	13.2
1b	Nuttall's sandwort and hedgehog cactus	117.4 acres - predominantly sagebrush/perennial grassland, with some aspen and intermittent stream/dry gully.	95.4	31
1c	none	62.6 - predominantly sagebrush/perennial grassland, with some aspen and intermittent stream/dry gully.	163.9	24.4
2a	none	1.9 - sagebrush/perennial grassland and intermittent stream/dry gully.	16.9	none
2b	Columbia milkvetch	224.2 - predominantly sagebrush/perennial grassland, with some intermittent stream/dry gully and basalt cliff/rock.	68.8	24
2c	none	96.2 - predominantly sagebrush/perennial grassland, with some intermittent stream/dry gully and basalt cliff/rock.	110	145.3
2d	Columbia milkvetch	113.6 - predominantly sagebrush/perennial grassland, with some intermittent stream/dry gully and basalt cliff/rock.	22.3	0.8
3a	none	2.1 – sagebrush/perennial grassland.	none	0.6
3b	Columbia milkvetch, caespitose evening-primrose, and Nuttall's sandwort	120.8 acres - predominately sagebrush/perennial grassland with lesser amounts of basalt cliff/rock, riparian, and intermittent stream/dry gully.	36.3	264.5
3c	none	195.5 acres - predominately sagebrush/perennial grassland with lesser amounts of basalt cliff/rock, riparian, and intermittent stream/dry gully.	107.2	187

[1]Unsuitable habitat included: agricultural land; developed, road, or firebreak; irrigation canal; open water; and watered poplar. Marginal habitat included: annual grassland, perennial grassland; rabbitbrush/annual grassland, and sagebrush annual grassland. Suitable habitat included: basalt cliff/rock, sagebrush/perennial grassland, aspen, intermittent stream or dry gully, and riparian.

Caespitose Evening-Primrose

Caespitose evening-primrose is a BLM Sensitive and a Washington State Sensitive species. This species is known to occur from eastern Oregon eastward through Montana and Wyoming and into the Dakotas. In Washington, caespitose evening-primrose is present in Kittitas, Yakima, Grant, and Benton counties in the Columbia Basin and occurs as scattered individuals or colonies on talus or rocky slopes as well as along the flat terrace of the Columbia River. Caespitose evening-primrose is often associated with big sagebrush or scabland sagebrush (*Artemisia rigida*) and is found at elevations from 400 to 1,200 feet. Threats to this species include habitat disturbance by grazing, road construction and maintenance, land conversion, and mineral extraction (WNHP and BLM 2005).

WNHP records indicate that caespitose evening-primrose occurrences have been documented within one mile of Route Segments 3b and 3c: four occurrences within one mile of Route Segment 3b and one occurrence within one mile of Route Segment 3c (Table 3.2-5). One occurrence of caespitose evening-primrose was located during the special status plant surveys along Route Segment 3b. This occurrence was located in a previously documented location and consisted of approximately 75 individuals scattered throughout 0.14 acre within the 160 foot ROW corridor. Additional caespitose evening-primrose occurrences could be present within the Project area as suitable habitat is available within all of the route segments (Table 3.2-6). Current threats to this occurrence of caespitose evening-primrose include invasion of exotic species, such as Russian knapweed and cheatgrass, human activities and OHV use.

Columbia Milkvetch

Columbia milkvetch is a federal Species of Concern, a BLM Sensitive Species, and a Washington State Sensitive Species. This species is known to occur only in Washington in an area approximately 25 miles by five miles along the west side of the Columbia River in Yakima, Kittitas, and Benton counties. Habitat for Columbia milkvetch consists of dry, often sandy places, with sparse vegetation and typically occurs on slopes. This species is associated with shrub-steppe vegetation and is found at elevations from 500 to 2,100 feet. Threats to this species include military training activities and livestock grazing (WNHP and BLM 2005).

WNHP records indicate that Columbia milkvetch has been documented within one mile of the following Route Segments: 2b – two occurrences; 2c – one occurrence; 2d – one occurrence; 3b – two occurrences; and 3c – one occurrence (Table 3.2-5). Special status plant surveys located three occurrences within Route Segments 2b, 2d, and 3b. All of these occurrences were within or near previously documented occurrences. The occurrence within Route Segment 2b consisted of approximately 116 individuals scattered throughout 1.9 acres. Route Segment 2d's occurrence consisted of approximately 110 individuals throughout 5.4 acres and the occurrence along Route Segment 3b contained approximately 158 individuals throughout 2.4 acres. Additional Columbia milkvetch occurrences could be present within the Project area as suitable habitat is available within all of the route segments (Table 3.2-6).Current threats to these occurrences include the invasion of exotic species and human activities.

Hedgehog Cactus

Hedgehog cactus is a BLM Strategic and Washington Sensitive Species. This species ranges from eastern Washington to Nevada, and has been found in Yakima, Kittitas, Chelan, Douglas, and Grant counties in Washington. In Washington, hedgehog cactus is found in thin, rocky soil on ridge tops, desert valleys, and low mountains, and at elevations from 1,000 to 4,000 feet. This species is often associated with scabland sagebrush. The greatest threat to hedgehog cactus is from cactus collectors (WNHP and BLM 2005).

Two occurrences of hedgehog cactus were documented during the special status plant survey along Route Segment 1b (Table 3.2-5). This species was not determined to be a special status plant until after the surveys were complete, therefore its mapped location is based on field notes and retrospective mapping. As such, information on number of individuals and acres occupied was not collected. Additional hedgehog occurrences could be present within the Project area as suitable habitat is available within all of the route segments (Table 3.2-6).

Nuttall's sandwort

Nuttall's sandwort is a BLM Sensitive and a Washington Threatened Species. This species is found in Washington, Oregon, California, Nevada, and Grant County Washington. In Washington, Nuttall's sandwort is found in dry basalt scree slopes, open gravelly benches or limestone talus and at elevations from 5,413 to 7,874 feet. Threats to this species are primarily from OHV use (WNHP and BLM 2005).

WNHP records indicate that one occurrence of Nuttall's sandwort has been documented within one mile of Route Segments 3b and 3c (Table 3.2-5). Two occurrences of Nuttall's sandwort were located during the special status plant surveys along Route Segments 1b and 3b. The occurrence within Route Segment 1b consisted of approximately 10 individuals scattered throughout 34 square feet. The occurrence of Nuttall's sandwort within Route Segment 3b consisted of one individual. Additional Nuttall's sandwort occurrences could be present within the Project area as suitable habitat is available within all of the route segments (Table 3.2-6). Current threats to these occurrences of Nuttall's sandwort include invasion of exotic species, such as cheatgrass.

3.2.2.4 Priority Ecosystem

The WNHP identifies species and ecosystems that are priorities for conservations efforts. Priority species and ecosystems are those that are rare or have very limited distribution (WNHP 2009). The priority species and ecosystems are giving a priority rating of 1, 2, or 3. Priorities are based on how well each is represented within existing natural areas, rarity and degree of threat; with Priority 1 communities being the rarest and with the highest degree of threat (WDNR 2011). The status of priority ecosystems with the potential to occur in the Project area were reviewed and documented during the field survey (WNHP 2009). Seven priority ecosystems are present within five miles of Route Segments 1c, 2b, 2c, 2d, 3a, 3b, and 3c (Table 3.2-7).

TABLE 3.2-7 PRIORITY ECOSYSTEMS DOCUMENTED IN PROJECT AREA

PRIORITY ECOSYSTEM	ROUTE SEGMENT(S) LOCATED WITHIN 5 MILES	NUMBER OF OCCURRENCES	TOTAL ACRES PRESENT WITHIN 5 MILES OF ROUTE SEGMENT(S)	PRIORITY OF ECOSYSTEM		
				1	2	3
Antelope bitterbrush-Indian ricegrass (*Achnatherum hymenoides*)	2d, 3b, 3c	2	2,445	X		
Big sagebrush-Bluebunch wheatgrass (*Artemisia tridentata-Pseudoroegneria spicata*)	1c, 2b, 2c, 2d, 3b, 3c	3	2,265			X
Big sagebrush- Sandberg bluegrass (*Artemisia tridentata-Poa secunda*)	2d, 3c	2	1,842			X
Intermountain Basins Active and Stabilized Dune	2d, 3a, 3b, 3c	7	6,498	X		

PRIORITY ECOSYSTEM	ROUTE SEGMENT(S) LOCATED WITHIN 5 MILES	NUMBER OF OCCURRENCES	TOTAL ACRES PRESENT WITHIN 5 MILES OF ROUTE SEGMENT(S)	PRIORITY OF ECOSYSTEM		
				1	2	3
Sand dropseed- Sandberg bluegrass (*Sporobolus cryptandrus-Poa secunda*)	3c	1	286		X	
Spiny hopsage-Sandberg bluegrass (*Grayia spinosa-Poa secunda*)	2d, 3c	1	24	X		
Thyme buckwheat-Sandberg bluegrass (*Eriogonum thymoides-Poa secunda*)	1c	1	1,834			X

Source: WNHP 2009. Priority 1 species/ecosystems are in danger of extinctions across their range. Priority 2 species/ecosystems may become endangered across their range, and Priority 3 species/ecosystems are vulnerable and declining.

3.2.3 Current Management Considerations

Federal and state legislation applicable to vegetation resources in the Project area are described below.

Endangered Species Act
The ESA directs federal agencies to conserve endangered and threatened species and to ensure that actions authorized, funded, or carried out by the agency are not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat.

BLM Special Status Species Management
BLM Manual 6840 – Special Status Species Management authorizes each BLM State Director to designate and protect sensitive species on lands managed by the BLM. This Project will be in compliance with BLM Manual 6840 which provides goals and objectives for the management of BLM Sensitive Species.

Executive Order 13112
Executive Order 13112 (Invasive Species) requires federal agencies address invasive species concerns and to not authorize or carry out new actions that would cause or promote the introduction of invasive species.

Federal Noxious Weed Act
The Federal Noxious Weed Act established a federal program to control and manage nonindigenous weeds that injure or have the potential to injure the interests of agriculture and commerce, wildlife resources, or the public health.

Washington State Noxious Weed Laws
Chapter 17.10 RCW is the primary weed law for Washington. Its goal is to limit Washington's economic loss due to noxious weeds in and around agricultural and natural areas. This holds landowners, including state and county land agencies, responsible for controlling noxious weeds on their property. It also establishes a program for administering the noxious weed law, which is carried out by the Washington State Noxious Weed Control Board, Washington Department of Agriculture, and County and District Noxious Weed Control Boards.

Chapter 16-750 WAC contains the Noxious Weed List, which is updated on an annual basis, definitions and descriptions.

Chapter 16-752 WAC contains a plant quarantine list that is maintained and regulated by the Washington State Department of Agriculture. This quarantine list contains ornamental plants that are or have the potential to become a noxious weed.

3.2.4 Route Segment or Zone-Specific Considerations

3.2.4.1 Zone 1

Route Segment 1a (Agency Preferred Alternative)
Route Segment 1a is comprised primarily of shrub-steppe communities that have been disturbed and are currently dominated by annual grasses such as cheatgrass (Table 3.2-1). There are patches of high quality, intact big sagebrush with native perennial bunchgrasses and a diverse forb layer. Route Segment 1a crosses two concrete-lined irrigation canals and several intermittent and/or ephemeral drainages with little or no riparian vegetation.

No special status plants are known to occur within one mile of Route Segment 1a and none were identified during the sensitive plant survey. One-hundred percent of federal lands (4.5 acres) within this route segment were surveyed for special status plants; however, the majority of Route Segment 1a is comprised of non-federal land (39.4 acres) and was not surveyed (Table 3.2-3). Approximately 8.1 acres of suitable habitat, 22.3 acres of marginal habitat, and 13.2 acres of unsuitable habitat is present within this route segment (Table 3.2-6). No priority ecosystems are within five miles of Route Segment 1a.

Seven noxious weed species were identified on federal land during the noxious weed survey and include: hoary cress (*Cardaria draba*), diffuse knapweed, Canada thistle (*Cirsium arvense*), kochia, Dalmatian toadflax (*Linaria dalmatica* ssp. *dalmatica*), Russian thistle, and puncturevine (*Tribulus terrestris*). Approximately 11.6 acres of federal land within Route Segment 1a are occupied by these seven noxious weed species (Table 3.2-2; Appendix B-4 Noxious Weed Report).

Route Segment 1b (Agency Preferred Alternative)
Route Segment 1b parallels an existing JBLM YTC fire break road. Vegetation along the fire break is disturbed and dominated by non-native species including cheatgrass and Russian thistle. Vegetation near the fire break consists of a mosaic of sagebrush with perennial bunchgrasses and annual grasses, rabbitbrush with annual grasses, and annual grasslands comprised predominately of cheatgrass (Table 3.2-1). Several small ephemeral creeks with upland vegetation are also crossed by Route Segment 1b. Kittitas Canyon Creek is crossed by Route Segment 1b and has an aspen grove and some riparian vegetation associated with it.

One occurrence of Nuttall's sandwort, a special status plant species, was identified along this route segment. This occurrence consisted of approximately 10 individuals scattered throughout 34 square feet within and along the ROW. Two occurrences of hedgehog cactus were documented during the special status plant survey along Route Segment 1b. This species was not determined to be a special status plant until after the surveys were complete, therefore its mapped location is based on field notes and retrospective mapping. As such, information on number of individuals and acres occupied was not collected. In addition, WNHP data indicates that Hoover's tauschia (*Tauschia hooveri*), a special status plant species, is known to occur within one mile of Route Segment 1b. However, Hoover's tauschia flowers in early to late March and may not have been detectable during the May surveys. Approximately 57 percent (138.2 acres) of federal lands within this route segment were surveyed for special status plants (Table 3.2-3). The remaining un-surveyed area consisted of 103.7 acres of inaccessible federal lands and

1.9 acres of non-federal lands. Approximately 117.4 acres of suitable habitat, 95.4 acres of marginal habitat, and 31.0 acres of unsuitable habitat is present within this route segment (Table 3.2-6). No priority ecosystems are within five miles of Route Segment 1b.

Seven noxious weed species were identified on federal land during the noxious weed survey and include: burningbush (*Bassia scoparia*), hoary cress, diffuse knapweed, Canada thistle, perennial pepperweed (*Lepidium latifolium*), scotch thistle (*Onopordum acanthium*) and Russian thistle. Approximately 33.7 acres of federal land within Route Segment 1b are documented as occupied by these seven noxious weed species; however, burningbush and Russian thistle occurrences were not mapped because of their ubiquitous and dominant nature on federal land within the Project area (Table 3.2-2; Appendix B-4 Noxious Weed Report).

Route Segment 1c

Route Segment 1c parallels Route Segment 1b for the majority of the route segment. Vegetation along Route Segment 1c consists primarily of non-native annual grasses (cheatgrass) with pockets of perennial bunchgrasses (primarily crested wheatgrass) and sagebrush (Table 3.2-1). A small amount of riparian vegetation is present along the margins of Kittitas Canyon Creek that is crossed by Route Segment 1c.

No special status plant species were identified during special status plant surveys along Route Segment 1c; however, WNHP data indicates that Hoover's tauschia is known to occur within one mile of Route Segment 1c. One-hundred percent (1.7 acres) of federal lands within this route segment were surveyed for special status plants; however, the majority of Route Segment 1c is comprised of non-federal land (249.6 acres) and was not surveyed (Table 3.2-3). Approximately 62.6 acres of suitable habitat, 163.9 acres of marginal habitat, and 24.4 acres of unsuitable habitat is present within this route segment. Two priority ecosystems, big sagebrush-bluebunch wheatgrass and thyme buckwheat-Sandberg bluegrass, are located approximately 4.5 miles southwest of this route segment.

Five noxious weed species were identified on federal land during the noxious weed survey and include: burningbush, diffuse knapweed; perennial pepperweed; scotch thistle; and Russian thistle. Approximately 0.6 acre of federal land within Route Segment 1b are documented as occupied by these five noxious weed species; however, burningbush and Russian thistle occurrences were not mapped because of their ubiquitous and dominant nature on federal land within the Project area (Table 3.2-2; Appendix B-4 Noxious Weed Report).

3.2.4.2 Zone 2

Route Segment 2a (Agency Preferred Alternative)

Non-native annual grasses dominate this short segment (Table 3.2-1). Route Segment 2a crosses a small unnamed creek which has some riparian vegetation present.

No special status plant species are known to occur within one mile of Route Segment 2a. The entire route segment (19.3 acres) is comprised of non-federal land (249.6 acres) and was not surveyed (Table 3.2-3). Approximately 1.9 acres of suitable habitat and 16.9 acres of marginal habitat are present within this route segment (Table 3.2-6). No priority ecosystems are known to within five miles of Route Segment 2a.

No noxious weeds are known to occur along this short route segment; however, as this route segment is comprised entirely of non-federal land, this route segment was not surveyed.

Route Segment 2b
Vegetation along Route Segment 2b consists of a mix of sagebrush with perennial bunchgrasses and non-native annual grasslands (Table 3.2-1). Route Segment 2b crosses several ephemeral drainages with primarily upland vegetation present.

Columbia milkvetch, a special status plant species, was documented along this route segment. This occurrence was near a previously documented WNHP population and consisted of approximately 116 individuals scattered throughout 1.9 acres. Approximately 85 pecent (43 acres) of federal lands within this route segment were surveyed for special status plants; however, the majority of Route Segment 2b is comprised of non-federal land (266.9 acres) and was not surveyed (Table 3.2-3). Approximately 224.2 acres of suitable habitat, 68.8 acres of marginal habitat, and 24.0 acres of unsuitable habitat is present within this route segment. One priority ecosystem, big sagebrush-bluebunch wheatgrass, is located approximately 4.5 miles southeast of this route segment.

Three noxious weed species were identified on federal land, primarily along JBLM YTC's fuel break, during the noxious weed survey and include: diffuse knapweed, field bindweed (*Convolvulus arvensis*), and Russian thistle. Less than 0.1 acre of federal land within Route Segment 2b was documented as occupied by these three noxious weed species; however, Russian thistle occurrences were not mapped because of their ubiquitous and dominant nature on federal land within the Project area (Table 3.2-2; Appendix B-4 Noxious Weed Report).

Route Segment 2c (Agency Preferred Alternative)
Vegetation along Route Segment 2c consists of a mix of sagebrush with perennial bunchgrasses and annual grasses (Table 3.2-1). The eastern portion of Route Segment 2c is private land utilized for agricultural purposes. Several un-named ephemeral drainages with some riparian vegetation are crossed by Route Segment 2c.

No special status plant species were identified along Route Segment 2c; however, WNHP data indicates that Columbia milkvetch is known to occur within one mile of Route Segment 2c. Approximately 50 percent (0.1 acre) of federal lands within this route segment were surveyed for special status plants; however, the majority of Route Segment 2c is comprised of non-federal land (351.5 acres) and was not surveyed (Table 3.2-3). Approximately 96.2 acres of suitable habitat, 110.0 acres of marginal habitat, and 145.3 acres of unsuitable habitat is present within this route segment. One priority ecosystem, big sagebrush-bluebunch wheatgrass, is located approximately four miles southeast of this route segment.

No noxious weeds are known to occur along Route Segment 2c; however, as the majority of this route segment is comprised of non-federal land, much of this route segment was not surveyed.

Route Segment 2d (Agency Preferred Alternative)
Route Segment 2d is comprised of primarily of annual grasslands, with pockets of perennial grasslands and sagebrush with a perennial grass understory (Table 3.2-1). Some riparian vegetation is present along the ephemeral drainages that are crossed.

Columbia milkvetch, a special status plant species, was documented along this route segment. This occurrence was near a previously documented population and consisted of approximately 110 individuals throughout 5.4 acres. WNHP data indicates that two additional special status species, awned halfchaff sedge (*Lipocarpha aristulata*) and gray cryptantha (*Cryptantha leucophaea*), are known to occur within one mile of Route Segment 2d. One-hundred percent (19.7 acres) of federal lands within this route segment were surveyed for special status plants; however, the majority of Route Segment 2d is comprised of non-federal land (117.3 acres) and was not surveyed (Table 3.2-3). Approximately 113.6 acres of suitable habitat, 22.3 acres of marginal habitat, and 0.8 acre of unsuitable habitat is present within this route segment (Table 3.2-6).

Five priority ecosystem types are located within five miles of Route Segment 2d. Two Antelope bitterbrush priority ecosystem occurrences are located within five miles of Route Segment 2d. Both of these occurrences are north of this route segment and on the north side of the Columbia River. Two big sagebrush-bluebunch wheatgrass priority ecosystem occurrences are located near Route Segment 2d; one is located approximately 4.5 miles southwest and the second is located adjacent to the northern end of the route segment. The big sagebrush-Sandberg bluegrass priority ecosystem is located approximately four miles east of Route Segment 2d. Two occurrences of the Intermountain basins active and stabilized dunes priority ecosystem are located north of this route segment, on the north side of the Columbia River. The last priority ecosystem located within five miles of Route Segment 2d is the spiny hopsage-Sandberg bluegrass type. This occurrence is located approximately four miles east of the route segment.

Russian thistle, a noxious weed, was documented along this route segment; however, Russian thistle occurrences were not mapped because of their ubiquitous and dominant nature on federal land within the Project area (Table 3.2-2; Appendix B-4 Noxious Weed Report). The majority of this route segment is comprised entirely of non-federal land, and as such, much of this route segment was not surveyed. Additional noxious weed species could be present.

3.2.4.3 Zone 3

Route Segment 3a (Agency Preferred Alternative)
Route Segment 3a is a short segment primarily comprised of sagebrush with a perennial bunchgrass understory (Table 3.2-1).

WNHP data indicates that beaked spike-rush (*Eleocharis rostellata*), Geyer's milkvetch (*Astragalus geyeri*), Great Basin gilia (*Aliciella leptomeria*), and gray cryptantha are known to occur within one mile of Route Segment 3a. This short-route segment is comprised entirely of non-federal land (3.3 acres) and was not surveyed (Table 3.2-3). Approximately 2.1 acres of suitable habitat and 0.6 acre of unsuitable habitat is present within this route segment (Table 3.2-6). Three occurrences of intermountain basin active and stabilized dune priority ecosystems are present within four miles of this route segment; two occurrences north of Route Segment 3a and one occurrence south of this route segment.

No noxious weeds are known to occur along this short route segment; however, as this route segment is comprised entirely of non-federal land, surveys were not conducted.

Route Segment 3b
Route Segment 3b parallels the western side of the Columbia River and Priest Rapids Lake for approximately 12 miles. This route is comprised principally of sagebrush with a perennial grass understory. A section of this route segment also crosses basalt cliffs. This route also parallels several orchards and a watered poplar wind row. Route Segment 3b crosses the Columbia River below Wanapum Dam. This route would cross five creeks as well as several un-named ephemeral drainages that are seasonally moist and with little or no riparian vegetation present. Some riparian vegetation is present along the portions of the Columbia River that occur within the Project area.

Three special status plant species were documented along this route segment: Nuttall's sandwort, Columbia milkvetch, and caespitose evening primrose. The occurrence of Nuttall's sandwort along Route Segment 3b consisted of one individual and was located near previously documented populations. The occurrence of Columbia milkvetch contained approximately 158 individuals within 5.4 acres and was located near previously documented populations. The occurrence of caespitose evening primrose was located within a previously documented location and consisted of approximately 75 individuals scattered throughout 0.14 acre within and along the ROW. In addition to the three special status species documented, Route Segment 3b has the largest number of special status species known to occur within one mile of the route segment: awned halfchaff sedge, beaked cryptantha (*Cryptantha rostellata*), beaked spike-rush, bristle-flowered collomia (*Collomia macrocalyx*), dwarf evening-primrose (*Camissonia pygmaea*), Geyer's milkvetch, Great Basin gilia, grand redstem (*Ammannia robusta*), gray cryptantha, Hoover's desert-parsley (*Lomatium tuberosum*), Kalm's lobelia (*Lobelia kalmia*), naked-stemmed evening-primrose (*Camissonia scapoidea ssp. scapoidea*), and white eatonella (*Eatonella nivea*). Wormskiold's northern wormwood (*Artemisia borealis var. wormskioldii*), a federally listed plant species, is known to occur within one mile of Route Segment 3b. Approximately 36 percent (61.1 acres) of federal lands within this route segment were surveyed for special status plants; however, the majority of Route Segment 3b is comprised of non-federal land (250.6 acres) and was not surveyed (Table 3.2-3). Approximately 120.8 acres of suitable habitat, 36.3 acres of marginal habitat and 264.5 acres of unsuitable habitat is present within this route segment (Table 3.2-6).

Three priority ecosystems are located with five miles of Route Segment 3b: Antelope bitterbrush-Indian ricegrass; big sagebrush-bluebunch wheatgrass; intermountain basins active and stabilized dune. The antelope bitterbrush-Indian ricegrass priority ecosystem is located on the north side of the Columbia River near the southern end of this route segment. The big sagebrush-bluebunch wheatgrass priority ecosystem is located less than one mile southeast of the southern tip of Route Segment 3b. Seven occurrences of the intermountain basins active and stabilized dune priority ecosystems are located within five miles of this route segment.

Eight noxious weed species were identified on federal land during the noxious weed survey and include: burningbush, Russian knapweed (*Acroptilon repens*), diffuse knapweed, Canada thistle, field bindweed, common St. Johnswort (*Hypericum perforatum*), Russian thistle, and Scotch thistle. Approximately 4.1 acres of federal land within Route Segment 3b are documented as occupied by these eight noxious weed species; however, burningbush and Russian thistle occurrences were not mapped because of their ubiquitous and dominant nature on federal land within the Project area (Table 3.2-2; Appendix B-4 Noxious Weed Report).

Route Segment 3c (Agency Preferred Alternative)
Sagebrush with an understory of perennial and annual grasses occurs along Route Segment 3c (Table 3.2-1). Additional vegetation communities present include rabbitbrush with an annual grass understory and grasslands dominated by non-native annual grasses. The southern portion of this route crosses agricultural croplands, including orchards, vineyards and row crops. Route Segment 3c parallels the Columbia River below Priest Rapids dam for approximately three miles. This route would also cross the Columbia River approximately five miles below Priest rapids Dam. Some riparian vegetation is present along the margin of the Columbia River. Route Segment 3c also crosses Lower Crab Creek, which has some emergent riparian vegetation associated with it. Several ephemeral drainages with little or no riparian vegetation are also crossed by this segment. Riparian habitats along this route segment were typically dominated by non-native species, including noxious weeds.

No special status plant species were identified along this route; however records indicate special status species have been documented within one mile of this route segment in the past. Route Segment 3c has the second largest number of special status species known to occur within one mile of the route segment: awned halfchaff sedge, beaked spike-rush, caespitose evening-primrose, Columbia cress (*Rorippa columbiae*), Columbia milkvetch (*Astragalus columbianus*), fuzzytongue penstemon (*Penstemon eriantherus var. whitedii*), Geyer's milkvetch, Great Basin gilia, gray cryptantha, Hoover's desert-parsley (*Lomatium tuberosum*), Nuttall's sandwort, Piper's daisy (*Erigeron piperianus*), Snake River cryptantha (*Cryptantha spiculifera*), and Wanapum crazyweed (*Oxytropis campestris var. wanapum*). Wormskiold's northern wormwood (*Artemisia borealis var. wormskioldii*), a federally listed plant species, is known to occur within one mile of Route Segment 3c. Approximately 99 percent (179.8 acres) of federal lands within this route segment were surveyed for special status plants; however, the majority of Route Segment 3c is comprised of non-federal land (308.7 acres) and was not surveyed (Table 3.2-3). Approximately 195.5 acres of suitable habitat, 107.2 acres of marginal habitat and 187.0 acres of unsuitable habitat is present within this route segment (Table 3.2-6).

Five priority ecosystems are located with five miles of Route Segment 3b: Antelope bitterbrush-Indian ricegrass; big sagebrush-bluebunch wheatgrass; big sagebrush-Sandberg bluegrass; intermountain basins active and stabilized dune; sand dropseed-Sandberg bluegrass; and spiny hopsage-Sandberg bluegrass. The antelope bitterbrush-Indian ricegrass priority ecosystem is located within five miles to the west and east of the southern end of this route segment. The big sagebrush-bluebunch wheatgrass priority ecosystem is located less than one mile southeast of the southern tip of Route Segment 3c. Seven occurrences of the intermountain basins active and stabilized dune priority ecosystems are located within five miles of this route segment. The sand dropseed-Sandberg bluegrass priority ecosystem is located approximately two miles from the southern tip of this route segment. The spiny hopsage-Sandberg bluegrass priority ecosystem is located approximately five miles south of this route segment.

Route Segment 3c has the most noxious weeds that were documented on federal land during the noxious weed survey. Fifteen noxious weed species were identified on federal land during the noxious weed survey and include: burningbush, diffuse knapweed, rush skeletonweed (*Chondrilla juncea*), Canada thistle, horseweed (*Conyza canadensis*), common catsear (*Hypochaeris radicata*), perennial pepperweed, scotch thistle, reed canarygrass (*Phalaris arundinacea*), common reed, Russian thistle, cereal rye (*Secale cereale*), purple loosestrife (*Lythrum salicaria*), groundsel (*Senecio vulgaris*), and puncturevine. Approximately 130.0 acres of federal land within Route Segment 3c are documented as occupied by these noxious weed species; however, burningbush and Russian thistle occurrences were not mapped because of their ubiquitous and dominant nature on federal land within the Project area and horseweed, common catsear, groundsel and puncturevine were not determined to be noxious until after surveys were complete (Table 3.2-2; Appendix B-4 Noxious Weed Report).

3.3 WILDLIFE AND SPECIAL STATUS WILDLIFE SPECIES

The proposed Project would cross known habitat for fish, wildlife and special status animal species. Special status wildlife species include the following: those species listed under the Endangered Species Act (ESA) as endangered, threatened, proposed, or candidate species; Bureau of Land Management (BLM) sensitive species; USFWS species of concern; and state listed threatened, endangered or priority species. This section describes the wildlife species and associated wildlife habitat present in the Project area. For the purposes of this analysis, the Project area was defined as a two mile corridor; one mile from either side of alternative route segment centerlines; however, where appropriate, the Project area was expanded to address potential impacts to species based on known ranges and potential to occur within the Project area.

The analysis considered issues related to wildlife raised during the public scoping process, which occurred during January and February of 2010 and January of 2011. Scoping comments included concerns about the potential impacts to sage-grouse and other special status wildlife species and the potential for avian collisions. These comments were considered during data collection and analysis of wildlife and special status wildlife species within the Project area.

3.3.1 Data Sources

The assessment of wildlife and special status wildlife species and habitat was conducted using species occurrence data obtained from the Washington Natural Heritage Program (WNHP), Washington Department of Fish and Wildlife (WDFW), JBLM YTC and BLM; Project-specific field studies; planning documents; previously conducted studies; and resource management plans. Sources reviewed included:

- U.S. Department of the Army (Army), Final Environmental Impact Statement (EIS) for Fort Lewis Army Growth and Force Structure Realignment, July 2010.
- Hanford Reach National Monument Final Comprehensive Conservation Plan and EIS, August 2008.
- Terrestrial Habitat Assessment Priest Rapids Project Federal Energy Regulatory Commission (FERC) 2114 Final Report, January 2003.
- Biological Assessment for Bonneville Power Administration (BPA) Schultz-Hanford Area Transmission Line, September 2002.
- Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) Cultural and Natural Resource Management Plan (RMP), January 2002.
- Spokane District RMP (1985) and Record of Decision (ROD)(1987) and the 1992 RMP amendment (BLM 1992) and ROD.
- Sage-Grouse Survey Reports (2010 and 2011) for the Proposed Vantage to Pomona 230 kV Transmission Line Project, March 2011 and May 2011.
- Digital element occurrence records of current and historical rare and imperiled species were obtained from Washington National Heritage Program (WNHP).
- Priority habitat and species (PHS) data were obtained from Washington Department of Fish and Wildlife (WDFW).
- Wildlife protection areas and sage-grouse data were obtained from JBLM YTC.
- BLM geographic information system (GIS) information for area habitats and special status species observations.
- Sage-Grouse Aerial Lek Survey Report (2010 and 2011) for the Proposed Vantage to Pomona 230 kV Transmission Line Project (POWER Engineers 2011).
- Sage-Grouse Habitat Assessment Report, August 2011 (POWER Engineers 2011).

- Washington Gap Analysis (GAP) data was obtained from the U.S. Geological Survey (USGS) Gap Analysis program.

A comprehensive list of special status wildlife species with the potential to occur in the Project area was compiled utilizing occurrence data from BLM, JBLM YTC, WDFW and WNHP; the federal threatened and endangered species list for each county located within the Project area; State of Washington listed species; the BLM sensitive species list; and JBLM YTC sensitive species. The species list also included other sensitive species protected under the Bald and Golden Eagle Protection Act and/or Migratory Bird Treaty Act and game species which may occur within the area. Through habitat suitability assessments, evaluations of species range, known occurrences and discussion with BLM and USFWS biologists this species list was refined to include 79 focal species. These species are discussed in Sections 3.3.2.2, Federally Threatened and Endangered Species, and 3.3.2.3, Species of Concern and State-Listed Species, and are presented in Tables 3.3-2 to 3.3-7).

3.3.2 Current Conditions and Trends, Regional Overview

3.3.2.1 Species and Habitats - General

The vegetative communities associated with the Project area support a diversity of wildlife, including approximately 22 species of reptiles and amphibians, 174 species of birds, and 50 species of mammals (JBLM YTC 2002). Wildlife species and the four general habitat classifications are discussed below and presented in Table 3.3-1.

The Project area lies within the Columbia Plateau ecoregion (EPA 2010). The Columbia Plateau is an arid sagebrush (*Artemisia* spp.) steppe and grassland that is surrounded by ecoregions that are typically moister, forested and mountainous (EPA 2010). Before the arrival of settlers in the early 1800s, approximately 15 million acres of steppe habitat existed in eastern Washington (Daubenmire 1970; Stinson et al. 2004). Currently, it is estimated that about 50 percent, approximately 7.4 million acres, remains in Washington. The majority of the shrub-steppe vegetation was lost to agricultural cropland; however roads, residential and commercial development, and inundation by reservoirs have also contributed to the reduction in shrub-steppe habitat (Stinson et al. 2004).

The most frequently occurring habitat types in the Project area include shrublands, perennial and annual grasslands and agricultural/pastures (Table 3.3-2). Shrub-steppe habitat is located primarily west of the Columbia River and the agricultural development is located east of the Columbia River and south of the Saddle Mountains. The Project area sagebrush-steppe habitat has been fragmented by the invasion of non-native plants, roads, residential development, livestock grazing, agricultural land use, and fire. The JBLM YTC is located directly adjacent to and within portions of the Project area. The JBLM YTC lies within the largest remaining contiguous block of intact shrub-steppe in the state of Washington (JBLM YTC 2002). For more information on vegetation in the Project area, refer to section 3.2 Vegetation and Special Status Plant Species.

Very few riparian areas occur within the Project area, and are primarily seasonally moist uplands. These drier riparian areas are typically vegetated with upland shrubs, including sagebrush. For more information on water resources in the Project area, refer to section 3.14 Water Resources.

TABLE 3.3-1 REPRESENTATIVE WILDLIFE SPECIES AND ASSOCIATED HABITAT TYPES PRESENT WITHIN THE PROJECT AREA

HABITAT TYPE			
SHRUB-STEPPE	**GRASSLAND**	**BASALT CLIFFS**	**RIPARIAN AND WETLAND**
Birds American goldfinch Brewer's sparrow California quail chukar common nighthawk ferruginous hawk golden eagle grasshopper sparrow lark sparrow lazuli bunting loggerhead shrike mourning dove prairie falcon ring-necked pheasant sage sparrow* sage thrasher* sage-grouse* Swainson's hawk vesper sparrow western kingbird	**Birds** Brewer's blackbird Brewer's sparrow burrowing owl common nighthawk horned lark lark sparrow loggerhead shrike long-billed curlew northern harrier vesper sparrow western meadowlark	**Birds** canyon wren ferruginous hawk golden eagle great horned owl prairie falcon	**Birds** American crow American kestrel American robin bald eagle black-billed magpie brown-headed cowbird Bullock's oriole eastern kingbird European starling great horned owl house sparrow lazuli bunting mourning dove northern flicker red-tailed hawk song sparrow violet-green swallow western wood peewee
Mammals badger bighorn sheep coyote deer mouse elk Merriam's shrew mule deer northern pocket gopher pronghorn* pygmy rabbit* sagebrush vole*	**Mammals** northern pocket gopher yellow-bellied marmot	**Mammals** big brown bat bighorn sheep bushy-tailed woodrat coyote fringed myotis little brown bat mule deer western small-footed bat yellow-bellied marmot	**Mammals** raccoons porcupine mink beaver montane voles
Reptiles and Amphibians pygmy short-horned lizard sagebrush lizard*	**Reptiles and Amphibians** racer	**Reptiles and Amphibians** gopher snake nightsnake racer sagebrush lizard striped whipsnake western rattlesnake	**Reptiles and Amphibians** Pacific tree frog long-toed salamander painted turtle

*Denotes a sagebrush obligate species; this table is not intended to be a comprehensive list, but rather a representation of wildlife species associated with habitat types present in the Project area. Sources: Paige and Ritter 1999; Dobkin and Sauder 2004; Dobler et al. 1996; Rich et al. 2005; WDFW 2006; JBLM YTC 2002; Knutson and Naef 1997; Thomas 1979; Grant 1997; and Swearingen 2009.

TABLE 3.3-2 HABITAT TYPES WITHIN THE PROJECT AREA (ACRES)

VEGETATION COVER TYPE	ACRES WITHIN PROJECT AREA (ONE MILE FROM EITHER SIDE OF ROUTE SEGMENT CENTERLINES)										
	1a	1b	1c	2a	2b	2c	2d	3a	3b	3c	TOTAL[1]
Agriculture	570.8	495.1	1,107.1	132.7	3,358.4	10,627.1	40.4	0	885.4	11,182.5	**28,399.5**
Annual Grassland	3,166.7	8,342.3	8,957.4	2,140.2	4,528.6	7,061.9	60.1	42.0	435.0	6,472.8	**41,207.1**
Aspen	0	1.1	1.1	0	0	0	0	0	0	0	**2.1**
Developed	15.6	96.6	95.5	4.9	20.8	17.3	9.1	2.0	107.6	74.7	**444.0**
Intermittent Stream/Gully	1.0	13.6	13.6	3.5	11.2	14.4	4.5	0	1.25	0.3	**63.4**
Open Water/Canal	477.4	0	0	0	0	0.2	290.2	25.5	7,369.9	953.6	**9,116.9**
Perennial Grassland	144.5	3,688.2	3,399.3	184.0	1,152.3	411.8	503.6	2.2	3,907.8	2.9	**13,396.6**
Rabbitbrush/ Annual Grassland	0	15.1	15.1	0	0	0	0	0	8.9	40.1	**79.2**
Riparian	5.2	61.0	60.2	41.4	0	0	0.3	0	414.5	172.9	**755.5**
Basalt Cliffs/Rock	0	0	0	0	1.2	0.3	5.3	0	20.6	8.3	**35.8**
Sagebrush/ Annual grassland	0	5.4	5.4	0	0	0.4	0	2.0	5.9	617.7	**636.8**
Sagebrush/ Perennial grassland	335.2	5,147.1	4,701.9	745.2	13,856.6	6,967.7	9,960.4	2,119.8	16,412.9	14,031.0	**74,277.7**
Tree	0.7	0.3	0.3	0	0	0	0.2	0	20.9	0.2	**22.7**

[1]Numbers are rounded and may not sum exactly.

Shrub-Steppe

In the Project area, shrub-steppe habitat present consists primarily of sagebrush with a perennial grass understory. Shrub-steppe habitats are used by a diverse group of wildlife species. Some of these are sagebrush obligates (restricted to sagebrush habitats during the breeding season or year-round) or near-obligates (occurring in both sagebrush and grassland habitats). Sagebrush obligates include the sage sparrow (*Amphispiza belli*), Brewer's sparrow (*Spizella breweri*), sage thrasher (*Oreoscoptes montanus*), sage grouse (*Centrocercus urophasianus*), pygmy rabbit (*Brachylagus idahoensis*), sagebrush vole (*Lemmiscus curtatus*), sagebrush lizard (*Sceloporus graciosus*), and pronghorns (*Antilocapra americana*; Paige and Ritter 1999). As these species breed only in shrub-steppe habitats, disturbance or conversion of shrub-steppe to agricultural or annual grasslands directly affects their distribution. Shrub-steppe habitats typically provide unobstructed views over large areas, creating ideal hunting conditions for some raptors. Raptors that breed and/or forage in shrub-steppe habitats include prairie falcon (*Falco peregrinus*), ferruginous hawk (*Buteo regalis*), Swainson's hawk (*Buteo swainsoni*), and golden eagle (*Aquila chrysaetos*). Several upland game birds also use shrub-steppe habitats, including California quail (*Callipepla californica*), ring-necked pheasant (*Phasianus colchicus*), and chukar (*Alectoris chukar*), making these habitats important recreation areas (Dobkin and Sauder 2004; Dobler et al. 1996). Wildlife species commonly found in shrub-steppe habitat are presented in Table 3.3-1.

Grasslands

Grasslands in the Project area are typically dominated by annual grasses, such as cheatgrass (*Bromus tectorum*). Most native shrub-steppe birds either do not use cheatgrass or occur at lower densities (Shaw et al. 1999). However, cheatgrass monocultures produce an open landscape that is used by wildlife species including the long-billed curlew and burrowing owl (*Athene cunicularia*; Rich et al. 2005). Less common grasslands are dominated by perennial bunchgrasses such as crested wheatgrass (*Agropyron cristatum*). Many of the same species found in shrub-steppe habitats utilize perennial grasslands, including Brewer's sparrow, vesper sparrow, lark sparrow, loggerhead shrike, common nighthawk, and northern pocket gopher. Wildlife species commonly found in grasslands are presented in Table 3.3-1.

Basalt Cliffs

Rock talus and exposed rock habitats are important nesting and cover habitats for a variety of wildlife species. Cliff and talus slope habitats support small amounts of vegetation, but provide shade, cover and rearing sites. Cliffs are considered a priority habitat by the WDFW (2008). Many predators, such as coyotes are likely to forage in rock/talus habitats due to the occurrence of the small mammals. Bighorn sheep and mule deer are also likely to use these habitats. Sagebrush lizard, western rattlesnake (*Crotalus viridis*), night snake (*Hypsiglena torquata*), gopher snake (*Pituophis catenifer*), striped whipsnake (*Masticophis taeniatus*), and racer (*Coluber constrictor*) are all associated with rocky areas (WDFW 2006; JBLM YTC 2002). Wildlife species commonly found in basalt cliff habitat are presented in Table 3.3-1.

Riparian and Wetland Communities

Riparian and wetland communities comprise a small portion of the Project area, but these communities are characterized by higher productivity and greater habitat and species diversity compared to adjacent uplands (Knutson and Naef 1997). Water is an important and limiting factor in these areas and animal life depends on this resource, especially during dry times of the year (JBLM YTC 2002). Riparian habitats have been shown to support the highest bird diversity of any western habitat type. Some of the reasons that riparian habitats are so important to wildlife include: 1) the presence of water for drinking, bathing, or reproduction (amphibians); 2) high vegetation biomass; 3) structurally diverse habitats; 4) the presence of edge habitats; 5) the presence of cool, shaded, and humid microclimates; 6) escape cover in areas where habitats are otherwise much more open, and 7) readily usable corridors for migration and travel (Thomas 1979; Knutson and Naef 1997).

Except for trees on irrigated land (e.g., planted windbreaks adjacent to orchards) and around residential areas, trees in the Project area are limited. Several nonnative trees are established along portions of the Columbia River in the Project area. These include Russian olive (*Elaeagnus angustifolia*), Siberian elm (*Ulmus pumila*), and white mulberry (*Morus alba*). Although introduced to this area, these trees do provide suitable nest sites, food and cover for a suite of wildlife species (Grant 1997; Swearingen 2009). Riparian and wetland habitats are used by a variety of species including bald eagle (*Haliaeetus leucocephalus*; winter only), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), great horned owl, and European starling (*Sturnus vulgaris*). Wildlife species commonly found in riparian and wetland areas are presented in Table 3.3-1.

In the Project area, the quality of riparian and wetland communities as wildlife habitat is varied. The largest riparian and wetland areas consist of a band of riparian vegetation occurring along Lower Crab Creek and an aspen (*Populus tremuloides*) grove associated with an area that is seasonally moist. Much of the Lower Crab Creek riparian area is bordered by pastureland and disturbed, often grazed, shrub-steppe habitats.

3.3.2.2 Federally Threatened, Endangered and Candidate Species

Six species listed as endangered, threatened, or candidate occur, or are likely to occur, within the Project area (Table 3.3-3). More detail on these species is provided in the following sections.

TABLE 3.3-3 FEDERALLY LISTED SPECIES KNOWN OR MAY OCCUR WITHIN THE PROJECT AREA

COMMON NAME	SCIENTIFIC NAME	STATUS[1,2,3]	PROJECT AREA/ZONE
Bull trout	*Salvelinus confluentus*	T, WC, CH	Zone 3
Chinook salmon (Upper Columbia Spring Run)	*Oncorhynchus tshawytscha*	E, WC, CH	Zone 3
Greater sage-grouse	*Centrocercus urophasianus*	C, BLM-S, WT	Zones 1 & 2
Gray wolf	*Canis lupus*	E, WE	Zones 1, 2 & 3
Steelhead (Upper Columbia River)	*Oncorhynchus mykiss*	T, WC, CH	Zones 1 & 3
Washington ground squirrel	*Urocitellus washingtoni*	C, BLM-S, WC	Zones 1, 2 & 3

Sources: WDFW 2011a[1], BLM 2007[2], USFWS 2010a,b[3]. Key: E – Federal Endangered; T – Federal Threatened; C – Federal Candidate; SOC – Federal Species of Concern; BLM-S – BLM Washington Sensitive; BLM-C – BLM Washington Candidate; WE – Washington State Endangered; WC – Washington State Candidate, WS – Washington State Sensitive; WR – Washington State Rare; and WM – Washington State Monitor; CH – designated critical habitat.

Bull Trout

Bull trout (*Salvelinus confluentus*) was listed as a Threatened species under the ESA in June 1998 and is listed as a Candidate species by the WDFW. Critical habitat has been designated for the Columbia River bull trout Distinct Population Segment (DPS). The DPS extends from the Columbia River mouth and estuary throughout the Columbia Basin, including all tributaries historically accessible to the species. Bull trout have specific habitat requirements that influence their distribution and abundance, including water temperature, cover, channel form and stability, spawning and rearing substrate, and migratory corridors (WDFW 2000). They need cold water to survive, so they are seldom found in waters where temperatures exceed 59 to 64 degrees Fahrenheit (˚F). Bull trout also require stable stream channels, clean spawning and rearing gravel, complex and diverse cover, and unblocked migratory corridors (USFWS 2011a).

Historically, bull trout were found throughout the Pacific Northwest, Montana, Idaho, and northern California, as well as Nevada (Knowles and Gumtow 2005). Bull trout do occur within the reach of the Columbia River that is located within the Project area, but it is unlikely that they spawn in the streams present within the Project area. Streams within the Project area are intermittent, small and do not have optimal temperatures to provide suitable spawning and rearing habitat (BioAnalysts 2002; AECOM

Environment 2010). In addition, most streams in the Project area do not have continuous flow to either the Yakima or Columbia rivers during the time in which bull trout would potentially be spawning or migrating to spawn. Bull trout in the Columbia River DPS spawn in September and sometimes into mid-October, depending on the subpopulation. Variations in timing likely follow temperature patterns in the various tributaries (WDFW 2000; Whitesel et al. 2004).

Chinook Salmon (Upper Columbia River Spring Run)

The Upper Columbia River Spring Run Chinook salmon (*Oncorhynchus tshawytscha*) was listed as Endangered in March 1999 and is listed as a Candidate species by the WDFW. Critical habitat has been designated for the Upper Columbia River Spring Run Chinook salmon DPS. The Project area is within the Upper Columbia River Spring Run Evolutionarily Significant Unit (ESU) for Chinook salmon (NOAA 2012). The ESU includes all naturally spawned populations occurring in all accessible river reaches in the Columbia River tributaries upstream of Rock Island Dam and downstream of Chief Joseph Dam in Washington.

The reach of the Columbia River adjacent within the Project area is a migratory corridor for the Upper Columbia Spring Run Chinook salmon (NOAA 2012). In the Project area, upriver migration starts in early May and extends through August, with spawning occurring upriver of the Project area from late August to mid-September (Army 2010). Within the Project area, the Columbia River is designated critical habitat for this ESU. The JBLM YTC is excluded from the critical habitat designation (Army 2010).

Greater Sage-Grouse

The greater sage-grouse (*Centrocercus urophasianus*) is listed as a Candidate species under the ESA, a Sensitive species by BLM and a Threatened species by the WDFW. In March 2010, USFWS determined that listing the greater sage-grouse as an Endangered species is warranted, but the listing was precluded in order to complete higher priority listing actions. The greater sage-grouse in the Project area are a portion of the Columbia Basin DPS. A DPS is the smallest division of a taxonomic species permitted to be protected under the ESA. In May 2001, the U.S. Fish and Wildlife Service (USFWS) determined that greater sage-grouse in the Columbia Basin are a DPS under the Act and should be listed as Threatened; however, the listing was precluded by the need to protect higher priority species first (USFWS 2010b).The JBLM YTC supports one of two Washington populations remaining in the Columbia Basin DPS. The second population is located in Douglas and Grant Counties. The populations of greater sage-grouse in Washington are isolated from each another, as well as the surrounding populations in Idaho and Oregon.

In 2004, the State of Washington published the Greater Sage-Grouse Recovery Plan to summarize the current knowledge of sage-grouse in Washington and to outline strategies to increase population size and distribution. This Plan delineated distinctive regions in Washington, or management units, to focus recovery efforts in those areas most likely to contribute to reaching recovery objectives (Stinson et al. 2004). Fourteen management units were delineated based on current occupancy, land ownership, location, topography, habitat quantity, condition and potential (Stinson et al. 2004). The following management units are present within or near the Project area: Hanford, Saddle Mountains, Rattlesnake Hills, and Yakima Training Center.

Under the direction of Instruction Memorandum ([IM] No. 2010-071, March 5, 2010), BLM has adopted Washington's sage-grouse management units as tiered priority habitat units for the purposes of protecting and recovering this species (BLM 2010a; Stinson et al. 2004). According to the Instruction Memorandum "priority habitat" is the habitat of highest conservation value relative to maintaining sustainable sage-grouse populations range-wide. Priority habitat will be areas of high quality habitat supporting important sage-grouse populations, including those populations that are vulnerable to localized extirpation but necessary to maintain range-wide connectivity and genetic diversity (BLM 2010a).The four priority habitat units are described in more detail below. JBLM YTC has two sage-grouse protection zone designations, primary and secondary. The primary protection zone includes areas that are considered as essential sage-grouse habitat. Specific management within these areas includes seasonal restrictions of military activities, periodic closure of selected areas to training and habitat restoration/monitoring. Secondary protection zones provide indirect benefits to sage-grouse. They contain springs, riparian areas, wetlands and archaeological sites. Most training types are prohibited, especially vehicle use (JBLM YTC 2002). A map showing the management zones is included in Appendix A.

Tier 1 – Regularly Occupied Habitat
Tier 1 contains Mansfield Plateau, Moses Coulee, Crab Creek, JBLM YTC, and those portions of the Rattlesnake Hills and Umtanum Ridge management units adjacent to JBLM YTC north of Highway 24 and east of the Yakima River. Regularly Occupied Habitat includes intact sagebrush communities known to be occupied by resident breeding populations of sage-grouse and are considered to be of highest conservation value.

Within the Project area, Zones 1, 2, and a portion of 3 are classified as Tier 1 habitat units; however, habitat loss, degradation and fragmentation has already occurred in the Project area from other transmission lines, roads, highways and interstates, JBLM YTC training operations, non-native plant invasions, fire, alteration by livestock grazing and conversion of sagebrush steppe to residential and agricultural land (JBLM YTC 2002; Rice et al. 2008; Shaw et al. 1999).

Tier 2 – Connectivity Habitat
Tier 2 contains the Dry Falls and Colockum management units. Connectivity habitat includes areas important for providing habitat connections for movement corridors between breeding areas and between seasonally used areas and between the northern and southern populations. The Project area is not within any Tier 2 habitat units.

Tier 3 – Occasionally Occupied Habitat
Tier 3 contains the Bridgeport Point, Umtanum Ridge, Saddle Mountains and Rattlesnake Hills management units. Occasionally Occupied Habitat includes habitat that may be occupied on a seasonal or irregular basis. The majority of Zone 3 is classified as a Tier 3 habitat unit. A portion of Zone 2 is also within the Tier 3 designated area.

Tier 4 – Expansion Habitat
Tier 4 contains the Potholes, Hanford, Ahtanum Ridge and Toppenish Ridge management units. Expansion Habitat includes areas where expansion could occur through an improvement in habitat quality. The southern portion of Zone 3 near the Columbia River is within the Tier 4 habitat unit.

In addition, BLM's Washington, D.C. office (WO) has issued two recent IMs for greater sage-grouse: WO IM 2012-043, Greater Sage-Grouse Interim Management Policies and Procedures (BLM 2012a); and WO IM 2012-044, BLM National Greater Sage-Grouse Land Use Planning Strategy (BLM 2012b). The Columbia Basin DPS are addressed in other policies and planning efforts and are not covered by WO IM 2012-043. The WO IM 2012-044 provides direction to the BLM for the consideration of conservation measures identified in two documents: A Report on National Greater Sage-Grouse Conservation Measures (Sage-Grouse National Technical Team 2011) and the National Greater Sage-Grouse Planning Strategy (BLM 2011). The National Greater Sage-Grouse Planning Strategy excludes the Washington State DPS, stating that they will be addressed through other policies and planning efforts (BLM 2011).

Greater sage-grouse are closely associated with sagebrush ecosystems of western North America. Sagebrush habitat types have a tremendous amount of natural variation in vegetative composition, habitat fragmentation, topography, substrate, weather, and frequency of fire. Consequently, greater sage-grouse are adapted to a mosaic of sagebrush habitats throughout their range. Relatively tall sagebrush utilized include big sagebrush (*Artemisia tridentata*), three-tip sagebrush (*Artemisia tripartita*), and silver sagebrush (*Artemisia cana*). Greater sage-grouse are also adapted to relatively low sagebrush species such as low sagebrush (*Artemisia arbuscula*), black sagebrush (*Artemisia nova*) and forb-rich mosaics of low and tall sagebrush; riparian meadows; steppe dominated by native grasses and forbs; scrub-willow and sagebrush savannas (Connelly et al. 2003).

The greater sage-grouse population in Washington has been in overall decline since 1970 (Stinson et al. 2004). Habitat loss was probably the most important factor in the elimination of sage-grouse from most of their range in Washington; however, over harvesting may have aggravated the impacts of habitat fragmentation and accelerated local extinctions (Stinson et al. 2004). Within the JBLM YTC, sage-grouse occupy about 124,000 acres and have designated protection on 44,320 acres, approximately 13.5 percent of the JBLM YTC. Annual surveys for leks and lek counts have been conducted by JBLM YTC personnel to monitor trends and assess population status. Ten leks have been active since 1999. As of 2011, the 22-year population average on the JBLM YTC is 281 birds (Dunham 2011). Starting in 1989 radio telemetry research and population monitoring has shown that adult use and nesting and brood rearing occurs primarily south of Umtanum Ridge in proximity to leks. An additional center of breeding activity is located north of Umtanum Ridge near Lmuma Creek (Dunham 2011). Umtanum Ridge is within approximately eight miles of the Project area, while Lmuma Creek is over nine miles north of the closest route segment.

Active and inactive and historical leks are shown in Table 3.3-4 and discussed in Section 3.3.4 for each route segment. Active leks are defined as a lek that has been attended by male sage-grouse within the past 24 months (2010-2011). Inactive leks include any lek where sufficient data suggests that there was no strutting activity throughout the past 24 months (2010-2011). Historical leks include a formerly active lek site where no activity has been observed for greater than 24 months (JBLM YTC and PHS data). A map showing greater sage-grouse observations is included in Appendix A. Due to the sensitivity of sage-grouse location information, this map is presented at a small-scale (WDFW 2011c; Guggenmos 2012).

TABLE 3.3-4 NUMBER OF GREATER SAGE-GROUSE LEKS AND OBSERVATIONS WITHIN THE PROJECT AREA

	ACTIVE OR INACTIVE LEKS (NUMBER)[1]			PHS HISTORIC LEKS (NUMBER)[2]			OBSERVATIONS (NUMBER)[3]	
ROUTE SEGMENT	WITHIN 0.6 MILE	WITHIN 2 MILES	WITHIN 3 MILES	WITHIN 0.6 MILES	WITHIN 2 MILES	WITHIN 3 MILES	2001-2011	1988-2000
1a	0	0	0	0	0	0	0	0
1b	0	2	2	1	2	4	13	7
1c	0	2	2	0	2	3	10	7
2a	0	0	0	0	0	0	0	0
2b	0	2	2	0	0	0	4	1
2c	0	0	2	0	0	0	0	0
2d	0	0	1	0	0	0	1	0
3a	0	0	0	0	0	0	0	0
3b	0	1	1	0	0	0	2	0
3c	0	0	0	0	0	0	4	0

Notes: [1]Active leks are defined as a lek that has been attended by male sage-grouse within the past 24 months (2010-2011). Inactive leks include any lek where sufficient data suggests that there was no strutting activity throughout the past 24 months (2010-2011). [2]Historical leks include a formerly active lek site where no activity has been observed for greater than 24 months (JBLM YTC and PHS data). [3]Includes sage-grouse observations within 0.5 mile of each route segment (JBLM YTC and incidental observations during sage-grouse habitat assessment survey).

Two aerial greater sage-grouse lek surveys were conducted for this Project in 2010 and 2011. Each year's survey consisted of three separate aerial survey events that covered all route alternatives and included a three mile buffer on each side of the route alternatives. The survey protocol used was based on sage-grouse population monitoring protocol developed by JBLM YTC. Only two greater sage-grouse were observed during the three aerial lek surveys. These two individuals were located on JBLM YTC and were not attending a lek when observed. The Sage-Grouse Survey Report, with JBLM YTC's monitoring protocol, is presented in Appendix B-1. Nine incidental sage-grouse observations were also recorded during the three sensitive plant surveys. All of the sage-grouse observed were females. A map showing sage-grouse occurrences and management zones is presented in Appendix A.

In addition, a habitat assessment field survey to address the seasonal habitat requirements of sage-grouse was conducted. Assessment protocol was based on BLM's framework for assessing sensitive species habitats (BLM 2000). Suitable breeding, late brood-rearing, and winter sage-grouse habitat exists within Zones 1 and 2 of the Project area. Specific habitat present will be discussed by route segment in Section 3.3.4. The Sage-Grouse Habitat Assessment Report is presented in Appendix B-2.

Gray Wolf

In Washington, the gray wolf (*Canis lupus*) received listing as federally Endangered in March 1967. The gray wolf is known or believed to occur in Kittitas and Yakima Counties. The Project area borders the DPS of gray wolves that was delisted in May 2011; however, gray wolves are listed as Endangered within the Project area (USFWS 2011b).

Historically, wolves were found throughout most or all of Washington, but were extirpated from the state by the 1930s through trapping, poisoning, and shooting. Wolves are generalists in their habitat use and are opportunistic carnivores. Within their historical distribution, wolves occurred in habitats that had large ungulates present, including forests, shrub-steppe, prairies, swamps and coastal areas. Wolves hunt large prey species, such as deer, elk, and moose, but will also prey on smaller animals, scavenge carrion and occasionally eat fish and vegetation (WDFW 2011b).

As of July 2011, Washington had five confirmed wolf packs, none of which are located in or near the Project area (WDFW 2011b). Potential suitable habitat exists in the Project area.

Steelhead

The Project area is within the Upper Columbia River steelhead (*Oncorhynchus mykiss*) DPS, which is currently listed as Threatened under the ESA (NOAA 2012). This DPS includes all naturally spawned steelhead populations below natural and man-made impassable barriers in streams in the Columbia River Basin upstream from the Yakima River to the U.S.-Canada border (NOAA 2012). Within the Project area, the Columbia River is designated critical habitat. The JBLM YTC is excluded from the critical habitat designation (Army 2010).

Steelhead typically prefers fast water in small-to-large main stem rivers, and medium-to-large tributaries (Healey 2003). Although they will also use smaller streams with sufficient water flow, they tend to spawn in the main stem of streams where the water flow is high (Healey 2003). Summer steelhead have been documented in the segment of the Columbia River located within the Project area (SalmonScape 2011).

Washington Ground Squirrel

The Washington ground squirrel (Urocitellus washingtoni) is listed as a Candidate species under the ESA (December 2007), a BLM Sensitive Species and a Washington State Candidate. The range of the Washington ground squirrel has decreased dramatically, due mostly to loss and fragmentation of habitats (Rickart and Yensen 1991).

Washington ground squirrels are most commonly found in dry, open sagebrush or grassland habitats. They occur in areas with sandy soils along hillsides, in ravines and on river bottoms. Washington ground squirrels feed on a wide variety of grasses, green forbs, roots, bulbs, seeds, seed pods and some insects (Rickart and Yensen 1991). Adults emerge from hibernation in late January through March and feed throughout spring and into summer to accumulate body fat (NatureServe 2011). Adults are active until late May or early June and juveniles until late June or early July. During hot weather, Washington ground squirrels are the most active in the morning (NatureServe 2011; Rickart and Yensen 1991).Washington ground squirrels may spend up to eight months a year in hibernation or aestivation in their underground burrows. This period of seasonal dormancy encompasses the temperature extremes of both winter and summer.

The Washington ground squirrel occurs in grassland and shrubland habitats of the Columbia Plateau east and south of the Columbia River in Washington (Finger et al. 2007). Within the Project area, the Washington ground squirrel is known or believed to occur in Grant County. Ground squirrel surveys conducted in 2004 located occupied sites just north of the crest of the Saddle Mountains, well outside of the Project area (Finger et al. 2007). Suitable habitat occurs within the Project area.

3.3.2.3 Species of Concern and State-Listed Species

Seventy-three special status species occur or are likely to occur within the Project area (Tables 3.3-5 through 3.3-9). These include State of Washington listed (endangered, threatened, critical, and vulnerable) species, BLM Sensitive species, and USFWS Animal Species of Concern. These species are described in more detail below.

Invertebrate Species
Four invertebrate species with special status designation occur or have the potential to occur within the Project area (Table 3.3-5).

TABLE 3.3-5 STATE LISTED INVERTEBRATE SPECIES KNOWN OR MAY OCCUR WITHIN THE PROJECT AREA

COMMON NAME	SCIENTIFIC NAME	STATUS[1,2,3]	PROJECT AREA/ZONE
Barry's hairstreak	*Callophrys gryneus barryi*	BLM-S	Zones 1,2 & 3
California floater	*Anodonta californiensis*	SOC	Zone 3
Columbia clubtail	*Gomphus lynnae*	SOC	Zone 3
Western ridged mussel	*Gonidea angulata*	BLM-S	Zones 2 & 3

Sources: WDFW 2011a[1], BLM 2007[2], USFWS 2010a[3]. Key: E – Federal Endangered; T – Federal Threatened; C – Federal Candidate; SOC – Federal Species of Concern; BLM-S – BLM Washington Sensitive; BLM-C – BLM Washington Candidate; WE – Washington State Endangered; WC – Washington State Candidate, WS – Washington State Sensitive; WR – Washington State Rare; and WM – Washington State Monitor.

With the exception of the butterfly, Barry's hairstreak (*Callophrys gryneus barryi*), the other three invertebrate species are tied to surface waters and other aquatic environments associated with the Columbia River basins. **Barry's hairstreak** is found in juniper woodlands and forest openings that have juniper present. This butterfly will also utilize juniper (native and ornamental) in developed areas (Fleckenstein 2006). Limited suitable habitat is present within the Project area.

Eggs of the **Columbia clubtail** (*Gomphus lynnae*) are laid in the water, with the larvae burrowing into and overwintering in mud (Abbot 2007). This dragonfly is found in a variety of river habitats, ranging from sandy to muddy or rocky. Water flow tends to be slow-moving. Only five populations of Columbia clubtail are known, with the closest population occurring on the Yakima River (Abbot 2007). No known populations occur on the Columbia River or within the Project area.

The **California floater** (*Anodonta californiensis*) occurs in shallow muddy or sandy habitats in larger rivers, reservoirs, and lakes. The **western ridged mussel** (*Gonidea angulata*) occurs in creeks and rivers of all sizes, typically on firm mud to coarse particle substrates. Both mussel species have been documented in the Columbia River (Nedeau et al. 2009).

Fish Species

Eleven special status fish species occur or have the potential to occur in the Project area. All are associated with the Columbia River Basin and associated perennial surface waters in Zone 3. These species are listed in Table 3.3-6.

TABLE 3.3-6 SPECIAL STATUS FISH SPECIES KNOWN OR MAY OCCUR WITHIN THE PROJECT AREA

COMMON NAME	SCIENTIFIC NAME	STATUS[1,2,3]	PROJECT AREA/ZONE
Chum salmon	*Oncorhynchus keta*	BLM-C, WC	Zone 3
Coho salmon	*Oncorhynchus kisutch*	WC	Zone 3
Leopard dace	*Rhinichthys falcatus*	WC	Zone 3
Margined sculpin	*Cottus marginatus*	SOC, BLM-S	Zone 3
Mountain sucker	*Catostomus platyrhynchus*	BLM-S, WC	Zone 3
Pacific lamprey	*Lampetra tridentata*	SOC, WR	Zone 3
Pygmy whitefish	*Prosopium coulteri*	SOC, BLM-S, WS	Zone 3
River lamprey	*Lampetra ayresi*	SOC, BLM-S, WC	Zone 3
Sockeye salmon	*Oncorhynchus nerka*	WC, WR	Zone 3
Umatilla dace	*Rhinichthys umatilla*	BLM-S, WC	Zone 3

Sources: WDFW 2011a[1], BLM 2007[2], USFWS 2010a[3]. Key: E – Federal Endangered; T – Federal Threatened; C – Federal Candidate; SOC – Federal Species of Concern; BLM-S – BLM Washington Sensitive; BLM-C – BLM Washington Candidate; WE – Washington State Endangered; WC – Washington State Candidate, WS – Washington State Sensitive; WR – Washington State Rare; and WM – Washington State Monitor.

Chum salmon (*Oncorhynchus keta*) have the widest distribution of the Pacific salmon; however, most rivers have only a summer and fall run of spawning chum salmon (Pauley et al. 1988). Within the Project area, fall chum salmon have been documented in the Columbia River, occurring only below the Priest Rapids Dam (SalmonScape 2011). The Columbia River chum salmon within the Project area are outside the Columbia River chum salmon ESU designated as Threatened under the ESA (NOAA 2012). **Coho salmon** (*Oncorhynchus kisutch*) spend the first half of their life cycle rearing and feeding in streams and small freshwater tributaries. Coho salmon spawning habitat is small streams with stable gravel substrates (NOAA 2012). Within the Project area, Coho salmon have been documented in the Columbia River (SalmonScape 2011). The lower Columbia River Coho salmon within the Project area are outside the lower Columbia River Coho ESU designated as Threatened under the ESA (NOAA 2012). **Sockeye salmon** (*Oncorhynchus nerka*) exhibit a wide variety of life history patterns that reflect varying dependency on the freshwater environment. The vast majority of sockeye salmon spawn in or near lakes, for this reason, the major distribution and abundance of large sockeye salmon stocks are closely related to the location of rivers that have accessible lakes in their watersheds for juvenile rearing (NOAA 2012). In addition to lakes, sockeye salmon appear to consistently spawn in four tributaries of the Columbia River – the Methow, Entiat and Similkameen Rivers and Icicle Creek (NOAA 1997). These tributaries are located north of the Project area. The sockeye salmon within the Project area are outside the designated ESUs in Washington and do not have listing under the ESA (NOAA 2012).

Pygmy whitefish (*Prosopium coulteri*) are most commonly found in cool lakes and streams of mountainous regions. Streams inhabited typically have moderate to swift current and may be silty or clear (Hallock and Mongillo 1998). Limited habitat for pygmy whitefish is present within the Project area and it is unlikely that they occur (Hallock and Mongillo 1998).

The **pacific lamprey** (*Lampetra tridentata*) and **river lamprey** (*Lampetra ayresi*) are the only two parasitic and migratory lampreys in the Columbia River system (Close et al. 1995; USFWS 2009). Relatively little is known about the status of lamprey species within the Columbia River Basin. Dam passage data and anecdotal information indicate that Pacific lampreys and river lamprey are in decline in the Columbia River Basin (Close et al. 1995). The current distribution of the Pacific lamprey could extend from the mouth of the Columbia River to Chief Joseph dam, north of the Project area (Moursund et al. 2001).

The **leopard dace** (*Rhinichthys falcatus*) and the **mountain sucker** (*Catostomus platyrhynchus*) inhabit flowing pools, gravel runs of creeks, small to medium rivers, and along the margins of lakes (Froese and Pauly 2011). Both the **Umatilla dace** (*Rhinichthys umatilla*) and the **margined sculpin** (*Cottus marginatus*) inhabit the riffles and runs of large rivers (Froese and Pauly 2011). The portion of the Columbia River present within the Project area is within the known range of the leopard dace, Umatilla dace, margined sculpin, and mountain sucker (NatureServe 2011; Froese and Pauly 2011).

Amphibian and Reptile Species

Three amphibian and six reptile special status species occur or have the potential to occur in the Project area (Table 3.3-7). A map showing the locations of sensitive wildlife species is presented in Appendix B; however, due to the sensitive nature of location information, this map is presented at a small-scale (WDFW 2011c; Guggenmos 2012).

TABLE 3.3-7 SPECIAL STATUS AMPHIBIAN AND REPTILE SPECIES KNOWN OR MAY OCCUR WITHIN THE PROJECT AREA

COMMON NAME	SCIENTIFIC NAME	STATUS[1,2,3]	PROJECT AREA/ZONE
AMPHIBIANS			
Columbia spotted frog	*Rana luteiventris*	WC	Zone 3
Northern leopard frog	*Rana pipiens*	SOC, WE	Zone 3
Western toad	*Bufo boreas*	WC	Zones 1, 2 & 3
REPTILES			
Night snake	*Hypsiglena torquata*	BLM-S	Zones 1, 2 & 3
Northwestern pond turtle	*Actinemys marmorata marmorata*	BLM-S	Zone 3
Sagebrush lizard	*Sceloporus graciosus*	SOC, BLM-S, WC	Zone 3
Sharptail snake	*Contia tenuis*	SOC, BLM-S, WC	Zones 1, 2 & 3
Side-blotched lizard	*Uta stansburiana*	BLM-S	Zones 1, 2 & 3
Striped whipsnake	*Masticophis taeniatus*	BLM-S, WC	Zones 1, 2 & 3

Sources: WDFW 2011a[1], BLM 2007[2], USFWS 2010a[3]. Key: E – Federal Endangered; T – Federal Threatened; C – Federal Candidate; SOC – Federal Species of Concern; BLM-S – BLM Washington Sensitive; BLM-C – BLM Washington Candidate; WE – Washington State Endangered; WC – Washington State Candidate, WS – Washington State Sensitive; WR – Washington State Rare; and WM – Washington State Monitor.

Amphibians

Most amphibian habitat is associated with Zone 3 due to the Columbia River Basin and related perennial surface waters. Historical data indicate that **northern leopard frogs** (*Rana pipiens*) were present within Crab Creek. Suitable habitat for northern leopard frog exists in Lower Crab Creek, but they are unlikely to occur due to the presence of introduced fish and bull frogs (McAllister et al. 1999; Grant County PUD 2003). **Columbia spotted frogs** (*Rana luteiventris*) are highly aquatic during all life stages. They breed in standing or sluggish water including ponds, lake edges, marshes, slow-moving streams, backwaters, and floodwater pools (AmphibiaWeb 2011). The Project area is on the periphery of the expected distribution of Columbia spotted frogs and they have never been reported in the vicinity of the Project area (Grant County PUD 2003). Suitable habitat is very limited in the Project area.

Western toads (*Bufo boreas*) occur in a wide variety of habitats including desert springs and streams, meadows and woodlands and mountain wetlands. Within the Washington portion of the Columbia Plateau, where the Project area is located, their distribution is limited (Hallock and McAllister 2005).

Reptiles

Reptiles are not especially diverse in the Columbia Basin, particularly when compared to arid areas that experience warmer winters. Reptile habitat is generally distributed across all Zones. The **night snake** (*Hypsiglena torquata*) occurs in a variety of habitats, from coastal dunes, mountain meadows, grasslands, to oak woodland and ponderosa pine forests (Weaver 2008). The night snake is known to occur in the Columbia Basin and there are several records within the Project area.

The **sharptail snake** (*Contia tenuis*) occurs in woodland, forests, grassland, and chaparral that are seasonally moist (Hoyer et al. 2006). Its range is limited to parts of California, Oregon, Washington, and extreme southwestern British Columbia (Hoyer et al. 2006). Limited suitable habitat for the sharptail snake is present within the Project area.

The **striped whipsnake** (*Masticophis taeniatus*) is rare throughout its range in Washington. There are relatively few published records for this species in Washington; records are concentrated in an area near the Columbia River north of Vantage (Hallock and McAllister 2005; Appendix A: Sensitive Wildlife Species). This species is found in sagebrush flats, grasslands, and in dry rocky canyons (Hallock and McAllister 2005).

The **northwest pond turtle** (*Actinemys marmorata marmorata*) is described as an aquatic turtle utilizing streams, ponds, lakes and ephemeral wetlands; however, it requires terrestrial habitats for nesting. The northwest pond turtle is reduced from much of its range in Washington, with only two documented populations remaining in the Columbia River Gorge. Additional turtles are believed to still occur in wetlands that have not been surveyed in western Washington and along the Columbia River (Brown 2011). In the Project area, potential suitable habitat is limited to Lower Crab Creek.

The **sagebrush lizard** (*Sceloporus graciosus*) is primarily associated with sand dunes and other sandy habitats that support shrubs and have large areas of bare ground (Hallock and McAllister 2005). This species is known to occur within the Project area near Vantage and Lower Crab Creek.

Side-blotched lizards (*Uta stansburiana*) occur in arid areas that support shrub-steppe habitat. They are most common in areas that have bare ground interspersed with shrubs and other vegetation (Hallock and McAllister 2005). Side-blotched lizards have not been documented in the Project area, but suitable habitat exists.

Bird Species

Thirty-six avian special status species are known or likely to occur in the Project area. Avian species have potential habitat throughout the entire Project area. A list of avian species likely to occur in the Project area is included in Table 3.3-8 below. A map showing the locations of sensitive wildlife species is presented in Appendix B; however, however, due to the sensitive nature of location information, this map is presented at a small-scale (WDFW 2011c; Guggenmos 2012).

TABLE 3.3-8 SPECIAL STATUS BIRD SPECIES KNOWN OR MAY OCCUR WITHIN THE PROJECT AREA

COMMON NAME	SCIENTIFIC NAME	STATUS[1,2,3]	PROJECT AREA/ZONE
PASSERINES AND OTHER BIRDS			
Black swift	*Cypseloides niger*	SOC	Zones 1, 2 & 3
Black-throated sparrow	*Amphispiza bilineata*	BLM-S	Zones 1, 2 & 3
Bobolink	*Dolichonyx oryzivorus*	BLM-S	Zones 1, 2 & 3
Cedar waxwing	*Bombycilla cedrorum*	BLM-S	Zones 1, 2 & 3
Gray flycatcher	*Empidonax wrightii*	BLM-S	Zones 1, 2 & 3
Lewis' woodpecker	*Melanerpes lewis*	WC	Zones 2 & 3
Lesser goldfinch	*Carduelis psaltria*	BLM-S	Zones 1, 2 & 3
Loggerhead shrike	*Lanius ludovicianus*	SOC, WC	Zones 1, 2 & 3
Oregon vesper sparrow	*Pooecetes gramineus affinis*	BLM-S	Zones 1, 2 & 3
Sage sparrow	*Amphispiza belli*	WC	Zones 1, 2 & 3
Sage thrasher	*Oreoscoptes montanus*	WC	Zones 1, 2 & 3
Upland sandpiper	*Bartramia longicauda*	BLM-S	Zones 1, 2 & 3
Vaux's swift	*Chaetura vauxi*	WC	Zones 1, 2 & 3
RAPTORS			
Bald eagle	*Haliaeetus leucocephalus*	SOC, BLM-S, WS	Zone 3
Burrowing owl	*Athene cunicularia*	SOC, BLM-S, WC	Zones 1, 2 & 3
Ferruginous hawk	*Buteo regalis*	SOC, BLM-S, WT	Zones 1, 2 & 3
Golden eagle	*Aquila chrysaetos*	WC	Zones 1, 2 & 3
Peregrine falcon	*Falco peregrinus*	SOC, BLM-S, WS	Zones 1, 2 & 3
Prairie falcon	*Falco mexicanus*	WM	Zones 1, 2 & 3
UPLAND GAME BIRDS			
Chukar	*Alectoris chukar*	WR	Zones 1, 2 & 3
Columbian sharp-tailed grouse	*Tympanuchus phasianellus columbianus*	SOC	Zones 1, 2, & 3
Mountain quail	*Oreortyx pictus*	BLM-S	Zones 1, 2 & 3
Ring-necked pheasant	*Phasianus colchicus*	WR	Zones 1, 2 & 3
WATERFOWL AND SHOREBIRDS			
American white pelican	*Pelecanus erythrorhynchos*	BLM-S, WE	Zone 3
Black-crowned night heron	*Nycticorax nycticorax*	WR	Zone 3
Clark's grebe	*Aechmophorus clarkii*	BLM-S, WC	Zone 3
Common loon	*Gavia immer*	BLM-S	Zone 3
Eared grebe	*Podiceps nigricollis*	BLM-S	Zone 3
Great blue heron	*Ardea herodias*	WR	Zone 3
Harlequin duck	*Histrionicus histrionicus*	BLM-S, WR	Zones 2 & 3
Long-billed curlew	*Numenius americanus*	BLM-S	Zones 1, 2 & 3
Sandhill crane	*Grus canadensis*	BLM-S, WE	Zones 1, 2 & 3
Tundra swan	*Cygnus columbianus*	WR	Zone 3
Western grebe	*Aechmophorus occidentalis*	WC	Zone 3

Sources: WDFW 2011a[1], BLM 2007[2], USFWS 2010a[3]. Key: E – Federal Endangered; T – Federal Threatened; C – Federal Candidate; SOC – Federal Species of Concern; BLM-S – BLM Washington Sensitive; BLM-C – BLM Washington Candidate; WE – Washington State Endangered; WC – Washington State Candidate, WS – Washington State Sensitive; WR – Washington State Rare; and WM – Washington State Monitor.

Passerine and Other Birds

The Project area lies within the critical breeding habitat of the **black swift** (*Cypseloides niger*); however nesting habitat for the black swift is highly specialized in forested areas near rivers. Nests are often located behind waterfalls or on damp cliffs (BirdWeb 2008). Suitable habitat is unlikely to occur within the Project area.

The **black-throated sparrow** (*Amphispiza bilineata*) occurs in desert scrub, saltbush, greasewood, sagebrush, antelope bitterbrush and rabbitbrush shrublands (Paige and Ritter 1999). In Washington, they often favor degraded and gravelly soils (BirdWeb 2008).The Project area is within the black-throated sparrow's core breeding habitat zone and suitable habitat is present within the Project area.

Bobolinks (*Dolichonyx oryzivorus*) are generally found in tall-grass prairies, hay fields, and similar open areas (BirdWeb 2008). The Project area is not within the bobolinks breeding habitat zone. Limited suitable habitat exists in developed agricultural land within the Project area.

Cedar waxwings (*Bombycilla cedrorum*) inhabit open, lowland woodlands with shrubs and small trees, especially when berry-producing shrubs are present. They are often found in streamside woods, forest clearings edges of wetlands, residential areas, orchards, and stands of Russian olive (BirdWeb 2008). Habitat is present throughout the Project area.

The **gray flycatcher** (*Empidonax wrightii*) is associated with sagebrush and juniper habitats. The Project area is within the migration corridor for the gray flycatcher (BirdWeb 2008). This species has not been documented on the JBLM YTC (DES 2000); however, suitable habitat is present within the Project area and migrant birds may occur.

Lewis' woodpecker (*Melanerpes lewis*) is associated with wooded riparian corridors (Larsen et al. 2004).There is limited suitable habitat present within the Project area, primarily along Lower Crab Creek.

The **lesser goldfinch** (*Carduelis psaltria*) occurs in are typically found in dry, open woodlands, pastures, steppe, forest openings and beside streams. In Washington, they are closely associated with Garry oak, especially at the brushy edges of Garry oak stands. The Project area is outside the known range of the lesser goldfinch (BirdWeb 2008). Potential suitable habitat exists within the Project area, but it is unlikely that lesser goldfinch are present.

In Washington, the **loggerhead shrike** (*Lanius ludovicianus*) breeds primarily in shrub-steppe habitats. The Project area is within the core breeding habitat zone for loggerhead shrikes (Larsen et al. 2004). Loggerhead shrikes have been documented in the Project area, in Zones 2 and 3. Large tracts of suitable shrub-steppe habitats occur throughout the Project area.

Oregon vesper sparrows (*Pooecetes gramineus affinis*) are commonly found in dry grasslands, sagebrush, and agricultural fields at low to moderate elevations. They are uncommon in sagebrush-steppe areas that are heavily grassed or have little grass cover (BirdWeb 2008; Paige and Ritter 1999). The Project area is within the known range of the Oregon vesper sparrow and suitable habitat exists.

The **sage sparrow** (*Amphispiza belli*) and **sage thrasher** (*Oreoscoptes montanus*) are sagebrush obligate avian species that are on the sensitive species list. The Project area is within the core breeding habitat for sage sparrows (Larsen et al. 2004). Sage sparrows have been documented in and near the Project area along Lower Crab Creek and in the JBLM YTC (DES 2000). Suitable habitat is present within the Project area. The sage thrasher is common in sagebrush and bitterbrush habitats in the Columbia Basin, but was more widespread prior to the conversion of large tracts of sagebrush habitats to agricultural lands. The Project area is within the core breeding habitat zone for sage thrasher (Larsen et al. 2004). Sage thrashers have been documented in the JBLM YTC during the summer months (DES 2000). Suitable habitat is present in the Project area.

Upland sandpipers (*Bartramia longicauda*) occur in native grasslands and are often found nesting at airports and airfields. The Project area is outside the known distribution of upland sandpipers, however rare migrants may occur within the Project area.

Vaux's swifts (*Chaetura vauxi*) forage over woodlands, lakes and rivers, where flying insects are abundant. They typically nest in old growth coniferous forests (BirdWeb 2008; Larsen et al. 2004). The Project area is within the known range of the Vaux's swift, probably only as a migration corridor (BirdWeb 2008; Larsen et al. 2004).

Raptors

In the winter, the Columbia River's reservoirs and major tributaries become significant **bald eagle** (*Haliaeetus leucocephalus*) habitat. Breeding bald eagles need large trees near open water with a relatively low level of human activity. In general, bald eagles nest near coastlines, rivers, large lakes or streams that support an adequate food supply (USFWS 2007). Bald eagles have been documented wintering in the JBLM YTC, foraging along the Columbia River (JBLM YTC 2002).

Burrowing owls (*Athene cunicularia*) are found in open, shrub-steppe or grassland habitats that have burrowing mammals, especially ground squirrels present (Paige and Ritter 1999). Burrowing owls have been documented as summer residents in the JBLM YTC and within Zones 1 and 2 (DES 2000).

The **ferruginous hawk** (*Buteo regalis*) is found in flat or rolling sagebrush steppe and other arid shrublands (Paige and Ritter 1999). The Project area is within the core breeding habitat zone for ferruginous hawks (Larsen et al. 2004). Ferruginous hawks occur as summer residents in the JBLM YTC and have been documented with Zone 2 of the Project area.

In Washington, **golden eagles** (*Aquila chrysaetos*) nest throughout much of the state and observations of golden eagles along the upper Columbia River suggest that they may remain at nest sites throughout the winter (Larsen et al. 2004). Golden eagles are commonly associated with open area, such as shrub-steppe, grasslands, open ponderosa pine forests and large clearcuts. They typically nest on cliff ledges and large trees (DeLong 2004). Nesting golden eagles have been documented in the Project area.

The cliffs and bluffs on the west side of the Columbia River provide habitat for several avian species, including **peregrine falcon** (*Falco peregrinus*) and **prairie falcon** (*Falco mexicanus*). In Washington, peregrine falcons typically nest in the San Juan Islands and the Puget Sound; however nests have been found in the dry arid climate of eastern Washington where peregrines nest on cliffs at prominent points overlooking major lakes or rivers (Hayes and Buchanan 2001). In the Project area, peregrine falcons have been observed in the basalt cliffs above the Columbia River. Prairie falcons are known to occur in the Project area, mostly along the cliffs and bluffs of the Columbia River. Prairie falcons winter throughout their breeding range in Washington, but the largest populations of wintering falcons are found in Adams, Benton, Grant, Franklin, and Walla Walla Counties (Larsen et al. 2004).

Upland Game Birds

Chukars (*Alectoris chukar*) are found in steep, rocky shrub-steppe habitats with perennial and annual grasses and forbs (Larsen et al. 2004). The Project area is within the primary management zone for chukar and they do occur within the Project area. Chukars have been documented in Zone 3, along Lower Crab Creek, the JBLM YTC, and near the Columbia River.

Columbian sharp-tailed grouse (*Tympanuchus phasianellus columbianus*) are associated with prairie grasslands and sagebrush grasslands with an understory of perennial bunchgrasses and forbs (Paige and Ritter 1999). The sharp-tailed grouse decline in Washington is primarily a result of loss and degradation of habitat. The Project area is within the historical range of the Columbian sharp-tailed grouse, but they are now known from only four counties in Washington (Stinson and Schroeder 2010). Potential suitable habitat exists in the Project area, but it is unlikely that Columbian sharp-tailed grouse are present.

Mountain quail (*Oreortyx pictus*) are found in areas with dense cover and scattered open areas, typically on slopes in foothills and mountains. In summer, mountain quail require a source of water, which may limit their nesting range. The Project area is outside the known range of the mountain quail and it is unlikely that they will occur.

Ring-necked pheasants (*Phasianus colchicus*) inhabit marshy areas and are rarely found in dry areas. They typically occur in cattail and willow patches near irrigated farmlands. The Project area is within the known range of the ring-necked pheasant. They have been documented on the JBLM YTC and near the Vantage Substation, just outside the Project area.

Waterfowl and Shorebirds
Several avian species are present along the Columbia River. Non-breeding **American white pelicans** (*Pelecanus erythrorhynchos*) are known to occur on islands below Wanapum Dam and **great blue herons** (*Ardea herodias*) and **black-crowned night herons** (*Nycticorax nycticorax*) occur on Goose Island above Priest Rapids Dam.

During the breeding season, **Clark's grebe** (*Aechmophorus clarkii*) and the **western grebe** (*Aechmophorus occidentalis*) prefer freshwater wetlands with a mix of open water and emergent vegetation (BirdWeb 2008). Clark's grebe and the western grebe are both known to occur within the Columbia National Wildlife Refuge. Clark's grebe is also known to occur in the Saddle Mountain Wildlife Refuge. Both Refuges are outside the Project area. In eastern Washington, **eared grebes** (*Podiceps nigricollis*) breed in large freshwater lakes and reservoirs with open water and emergent vegetation (BirdWeb 2008).

Migrant **common loons** (*Gavia immer*) winter along Washington's coast, the Columbia and Snake Rivers, and on lakes in northeastern Washington (Larsen et al. 2004). Records indicate that common loons are present within the Project area, along the Columbia River.

Harlequin ducks (*Histrionicus histrionicus*) require fast-flowing mountain streams with calm loafing sites located nearby (Larsen et al. 2004). The Project area is located outside the harlequin duck's known range and they have not been documented in the JBLM YTC (Larsen et al. 2004; DES 2000). There is limited suitable habitat present within the Project area and it is unlikely that harlequin ducks will occur.

Dry grasslands and shrub-steppe, generally near water, are the traditional breeding habitats of **long-billed curlews** (*Numenius americanus*). They will also nest in grain fields and pastures. The Project area is within the breeding and migration range of the long-billed curlew (BirdWeb 2008; Paige and Ritter 1999). They have been documented on the JBLM YTC and within the Project area.

Sandhill cranes (*Grus canadensis*) live in wet meadows, grasslands, and wetlands, and feed in grain fields and pastures. During migration and in winter, they live in more open prairie, agricultural fields, and river valleys (BirdWeb 2008; Larsen et al. 2004). The Project area is within the suspected migration range of sandhill cranes, but is not within a known migratory stopover or nesting area (Larsen et al. 2004).

Wintering and migrating **tundra swans** (*Cygnus columbianus*) feed in open habitats, including agricultural fields with stubble and in wetlands with emergent vegetation. Tundra swans do not breed in Washington. The Project area is within the migration range of tundra swans and they have been observed in the area (DES 2000; BirdWeb 2008).

Mammal Species
Fourteen mammal special status species are known or likely to occur in the Project area. Mammal species have potential habitat throughout the entire Project area. A list of mammal species likely to occur in the

Project area is included in Table 3.3-9. A map showing the locations of sensitive wildlife species is presented in Appendix B; however, due to the sensitive nature of location information, this map is presented at a small-scale (WDFW 2011c; Guggenmos 2012).

TABLE 3.3-9 SPECIAL STATUS MAMMAL SPECIES KNOWN OR MAY OCCUR WITHIN THE PROJECT AREA

COMMON NAME	SCIENTIFIC NAME	STATUS[1,2,3]	PROJECT AREA/ZONE
Bighorn sheep	*Ovis canadensis*	WR	Zones 1, 2 & 3
Black-tailed jackrabbit	*Lepus californicus*	BLM-S, WC	Zones 1, 2 & 3
Cascade red fox	*Vulpes vulpes*	WC	Zones 1, 2 & 3
Columbian black-tailed deer	*Odocoileus hemionus columbianus*	WR	Zone 3
Elk	*Cervus canadensis*	WR	Zones 1, 2 & 3
Merriam's shrew	*Sorex merriami*	WC	Zones 1, 2 & 3
Northwest white-tailed deer	*Odocoileus virginianus ochrourus*	WR	Zones 1, 2 & 3
Pallid bat	*Antrozous pallidus*	BLM-S	Zones 1, 2 & 3
Preble's shrew	*Sorex preblei*	WC	Zones 1, 2 & 3
Rocky mountain mule deer	*Odocoileus hemionus hemionus*	WR	Zones 1, 2 & 3
Spotted bat	*Euderma maculatum*	BLM-S	Zones 1, 2 & 3
Townsend's big-eared bat	*Corynorhinus townsendii*	BLM-S, WC	Zones 1, 2 & 3
Townsend's ground squirrel	*Spermophilus townsendii*	SOC, WC	Zones 1, 2 & 3
White-tailed jackrabbit	*Lepus townsendii*	BLM-S, WC	Zones 1, 2 & 3

Sources: WDFW 2011a[1], BLM 2007[2], USFWS 2010a[3]. Key: E – Federal Endangered; T – Federal Threatened; C – Federal Candidate; SOC – Federal Species of Concern; BLM-S – BLM Washington Sensitive; BLM-C – BLM Washington Candidate; WE – Washington State Endangered; WC – Washington State Candidate, WS – Washington State Sensitive; WR – Washington State Rare; and WM – Washington State Monitor.

Bighorn sheep (*Ovis canadensis*) typically occur in remote mountain terrain and in a variety of plant communities ranging from alpine meadows, woodlands, mixed-grass prairie, shrub-steppe, and dry pinyon-juniper (ASM 2011). Bighorn sheep have been observed in the JBLM YTC, but not within or near the Project area. Potential habitat exists within the Project area; however, suitable habitat may be limited to remote canyons outside the Project area.

Black-tailed jackrabbit (*Lepus californicus*) occurs in sagebrush and grasslands within the Columbia Plateau (ASM 2011). Black-tailed jackrabbits have been observed in the JBLM YTC and within the Project area in Zones 2 and 3. Suitable habitat exists throughout the Project area. **White-tailed jackrabbit** (*Lepus townsendii*) occurs in the grasslands of Columbia Basin (ASM 2011). They are associated with bunchgrass grasslands, rabbitbrush, and relatively undisturbed sagebrush-steppe habitats (DES 2000). White-tailed jackrabbits have not been documented within or near the Project area, but suitable habitat exists.

The **Cascade red fox** (*Vulpes vulpes*) is commonly associated with grasslands and forests. In developed areas, Cascade red foxes can also occur in agricultural areas (Tesky 1995). The Cascade red fox have been observed in the JBLM YTC, but has not been documented within the Project area. Suitable habitat exists throughout the Project area.

In Washington, WDFW identifies deer east of U.S. Route 97 (US-97) as **Rocky Mountain mule deer** (*Odocoileus hemionus hemionus*) and deer west of US-97 as **Columbian black-tailed deer** (*Odocoileus hemionus columbianus*). Rocky Mountain mule and Columbian black-tailed deer occupy a wide variety of habitats in Washington, including canyon complexes along the major rivers, shrub-steppe, grasslands, and coniferous forests. Shrub steppe and grasslands provide important deer habitat, especially during winter months. Suitable habitat exists throughout the Project area. The Columbia Basin represents the periphery of the white-tailed deer distribution in central Washington. The habitat in the Project area is generally more suitable for mule deer. In the Columbia Basin, **white-tailed deer** (*Odocoileus virginianus ochrourus*) are associated with riparian areas along creeks and streams, grasslands and agricultural land (WDFW 2010). Suitable habitat in the Project area is limited, occurring primarily near Lower Crab Creek in Zone 3.

Elk (*Cervus canadensis*) occur in open areas such as alpine pastures, marshy meadows, river flats, aspen parklands, and coniferous forests (Snyder 1991). Elk winter range generally consists of shrub-steppe habitats in relatively close proximity to denser forested cover areas. Elk are known to occur near the Project area and suitable habitat exists within the Project area (DES 2000)

Merriam's shrew (*Sorex merriami*) is most commonly found in big sagebrush, rabbitbrush and bitterbrush shrublands (Azerrad 2004). Information about the range of Merriam's shrew is limited; however it has been documented in the JBLM YTC and suitable habitat is present within the Project area (DES 2000; Azerrad 2004). The Project area occurs within the range of **Preble's shrew** (*Sorex preblei*), although this species has not been documented in the Project area or on the JBLM YTC (DES 2000). Recorded habitats for Preble's shrew include arid and semiarid shrub-grass associations dominated by sagebrush (NatureServe 2011). Suitable habitat exists within the Project area.

The **pallid bat** (*Antrozous pallidus*) is associated with rock cliffs in shrub-steppe or desert areas across the west. Typical shrubs in areas where pallid bats occur include antelope bitterbrush, sagebrush, rabbitbrush and forest cover types including ponderosa pine and riparian forests. They typically roost in cliff crevices, caves, mines, tree cavities, and occasionally buildings (DES 2000; Ferguson and Azerrad 2004). The Project area is within the known range of the pallid bat and they have been observed in the JBLM YTC (DES 2000; Ferguson and Azerrad 2004). Suitable habitat is present within the Project area. **Spotted bats** (*Euderma maculatum*) are found in vegetation types ranging from desert to sub-alpine meadows, including desert-scrub, pinyon-juniper woodland, ponderosa pine, mixed conifer forest, canyon bottoms, rims of cliffs, riparian areas, fields, and open pasture (Chambers and Herder 2005). Spotted bats are not known to occur within the Project area, but suitable habitat exists. **Townsend's big-eared bats** (*Corynorhinus townsendii*) have been documented in nearly every county in Washington. In Washington, Townsend's bats are found in mixed conifer-hardwood forest, ponderosa pine forest, shrub-steppe, and riparian-wetlands. There are no records of Townsend's bats occurring in or around the Project area and they have not been documented on JBLM YTC (DES 2000; Woodruff and Ferguson 2005).

Townsend's ground squirrels (*Spermophilus townsendii*) are associated with shrub-steppe (especially big sagebrush - wheatgrass association) and sandy soils, but can occasionally be found in agricultural fields. Their distribution is limited to Kittitas, Yakima, Benton and Klickitat counties. They have been documented on JBLM YTC and suitable habitat exists within the Project area (DES 2000; Howard 1996).

3.3.3 Current Management Considerations

Federal and State legislation applicable to biological resources in the Project area are similar to those described for Vegetation and Special Status Plant Species (Section 3.2) with the additions described below.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) and Executive Order 13186 protect more than 800 migratory bird species by making it illegal to take, possess, import, export, transport, sell, purchase, barter, or offer for sale any migratory bird, or the parts, nests, or eggs of such bird.

The Bald and Golden Eagle Protection Act
The Bald and Golden Eagle Protection Act prohibits any form of possession or take of bald and golden eagles.

Sage-Grouse Management Zones
Under the direction of a recent Instruction Memorandum (IM No. 2010-071, March 5, 2010), BLM has adopted Washington's sage-grouse management units as tiered priority habitat units for the purposes of protecting and recovering sage-grouse. JBLM YTC has also developed protection zones to provide direct and indirect benefits to sage-grouse.

3.3.4 Route Segment or Zone-Specific Considerations

3.3.4.1 Zone 1

Route Segment 1a (Agency Preferred Alternative)
Route Segment 1a is within the Tier 1 priority habitat unit for sage-grouse; however, this route is comprised primarily of disturbed shrub-steppe communities with annual grasses such as cheatgrass. This short route segment contains some suitable habitat for shrub-steppe and grassland species.

Route Segment 1a occurs within the Regularly Occupied Habitat (Tier 1) unit for greater sage-grouse. No greater sage-grouse leks are known to occur within three miles of Route Segment 1a and no greater sage-grouse observations have been documented within 0.5 mile of this route segment. Upper Yakima spring Chinook, upper Yakima summer steelhead, Yakima bright fall Chinook and Yakima bull trout/Dolly Varden occur in the Yakima River, to the west of Route Segment 1a. No additional sensitive species have been documented along Route Segment 1a.

Route Segment 1a crosses two concrete-lined irrigation canals and several intermittent and or ephemeral drainages with little or no riparian vegetation. Suitable habitat for riparian species is limited.

Route Segment 1b (Agency Preferred Alternative)
Vegetation along Route Segment 1b contains non-native species including cheatgrass and Russian thistle, and a mosaic of sagebrush with perennial bunchgrasses and annual grasses, rabbitbrush with annual grasses, and annual grasslands comprised predominately of cheatgrass. The shrublands provide suitable habitat for shrub-steppe and grassland species.

Route Segment 1b is within the Regularly Occupied Habitat (Tier 1) unit for greater sage-grouse. No known active or inactive leks occur within 0.6 mile of the route segment. One historic lek has been documented within 0.6 mile of this segment. Two active or inactive leks are known to occur within two miles and three miles of Route Segment 1b. All of these leks are located on adjacent JBLM YTC land. Greater sage-grouse have been documented (approximately 20 observations) within 0.5 mile of this route segment since 1988. The largest riparian area along Route Segment 1b is Kittitas Canyon Creek, which has an aspen grove and some riparian vegetation associated with it. As riparian communities are limited in the Project area, this area has greater habitat and species diversity compared with surrounding uplands. Several sensitive species have been documented along Route 1b, including greater sage-grouse, long-billed curlew, loggerhead shrike, and burrowing owl.

Route Segment 1c
Route Segment 1c parallels Route 1b for the majority of the route segment and has similar characteristics. Vegetation along Route 1c consists primarily of perennial bunchgrasses (crested wheatgrass) and non-native annual grasses (cheatgrass). The perennial grasslands provide some suitable habitat for species associated with grasslands.

The majority of Route Segment 1c is within the Regularly Occupied Habitat (Tier 1) unit for greater sage-grouse, with the remaining occurring within the Occasionally Occupied Habitat (Tier 3) unit. Two active or inactive leks are known to occur within two and three miles of Route Segment 1c. All of these leks are located on adjacent JBLM YTC land. Greater sage-grouse have been documented (approximately 17 observations) within 0.5 mile of this route segment since 1988. Some riparian vegetation is present along the margins of Kittitas Canyon Creek that is crossed by Route Segment 1c. Sensitive wildlife species occurring in this area include long-billed curlew, greater sage-grouse and burrowing owl.

3.3.4.2 Zone 2

Route Segment 2a (Agency Preferred Alternative)
Habitat along this short segment is limited due to the domination of non-native annual grasses. Route Segment 2a crosses a small creek which has some riparian vegetation present.

This route segment is within the Regularly Occupied Habitat (Tier 1) unit for sage-grouse. No greater sage-grouse leks are known to occur within three miles of Route Segment 2a. No greater sage-grouse have been documented within 0.5 mile of this route segment since 1988. No additional sensitive species are known to occur in this route segment.

Route Segment 2b
Route Segment 2b consists of a mix of sagebrush with perennial bunchgrasses and non-native annual grasslands. The shrublands provide suitable habitat for shrub-steppe and grassland species.

This route is within the Regularly Occupied Habitat (Tier 1) unit for sage-grouse. No active, inactive or historical leks are known to occur within 0.6 mile of Route Segment 2b. Two leks has been documented within two and three miles of this route segment. All of these leks are located on adjacent JBLM YTC land. Greater sage-grouse have been documented (approximately five observations) within 0.5 mile of this route segment since 1988. Route Segment 2b crosses several ephemeral drainages with some riparian vegetation present. Black-tailed jackrabbit and greater sage-grouse have been documented along this route. One greater sage-grouse lek occurs within one mile of this Route Segment.

Route Segment 2c (Agency Preferred Alternative)
Vegetation along Route Segment 2c consists of a mix of sagebrush with perennial bunchgrasses and annual grasses and provides suitable habitat for shrub-steppe and grassland species. The eastern portion of Route Segment 2c is private land utilized for agricultural purposes.

The majority of Route Segment 2c is within the Regularly Occupied Habitat (Tier 1) unit for sage-grouse, with the remaining occurring within the Occasionally Occupied Habitat (Tier 3) unit. Two greater sage-grouse leks are known to occur on JBLM YTC land within three miles of this route segment. No greater sage-grouse observations have been documented within 0.5 mile of this route segment since 1988. Several un-named ephemeral drainages with some riparian vegetation are crossed by Route Segment 2c. Sensitive species documented along this route include burrowing owl and long-billed curlew.

Route Segment 2d (Agency Preferred Alternative)
Route Segment 2d is comprised of primarily of non-native annual grasslands, with pockets of perennial grasslands and sagebrush with a perennial grass understory that provide suitable habitat for shrub-steppe and grassland species. The little riparian vegetation present along the ephemeral creeks provides limited potential habitat.

This route is within the Regularly Occupied Habitat (Tier 1) unit for sage-grouse. One greater sage-grouse lek is known to occur on JBLM YTC land within three miles of this route segment. Greater sage-grouse have been documented (one observation) within 0.5 mile of this route segment since 1988. Sensitive species documented along this route include prairie falcon, loggerhead shrike, greater sage-grouse and ferruginous hawk. Locations utilized by mule deer and chukar are crossed by Route Segment 2d near the Columbia River.

3.3.4.3 Zone 3

Route Segment 3a (Agency Preferred Alternative)
Route Segment 3a is a short segment with a habitat comprised of sagebrush and perennial bunchgrasses. Approximately half of Route Segment 3a is within the Occasionally Occupied Habitat (Tier 3) unit for sage-grouse, with the remaining portion of this route segment outside of designated sage-grouse priority habitat. No greater sage-grouse leks are known to occur within three miles of Route Segment 3a and no greater sage-grouse observations have been documented within 0.5 mile of this route segment since 1988. Sagebrush lizard, a sensitive species, is known to occur near Route Segment 3a.

Route Segment 3b
Route Segment 3b parallels the western side of the Columbia River and Priest Rapids Lake for approximately 12 miles. Habitat along this route is a mixture of sagebrush and perennial bunchgrasses and annual grasses. Nightsnake and sagebrush lizard, sensitive species, occur in sandy grasslands along this route. Loggerhead shrike, another sensitive species occurs in the shrub-steppe habitat present along this route. A section of this route segment also crosses basalt cliffs and bluffs which support small amounts of vegetation, but provide shade, cover and rearing sites. These habitats are used by golden eagle, ferruginous hawks, prairie falcon, peregrine falcon, and bald eagle. This route also parallels several orchards and a poplar wind row, which could provide some potential habitat. Route 3b crosses the Columbia River below Wanapum Dam. Non-breeding American white pelicans are known to occur on islands below Wanapum Dam.

The majority of Route Segment 3b is within the Regularly Occupied Habitat (Tier 1) unit for sage-grouse, with the remaining occurring within the Occasionally Occupied Habitat (Tier 3) unit. One sage-grouse lek is known to occur on JBLM YTC land within two miles and three miles of this route segment. Sage-grouse have been documented in the northern portion of this route, approximately two observations recorded since 1988. This route would cross five creeks as well as several un-named ephemeral drainages that are seasonally moist and with little or no riparian vegetation present. Locations utilized by mule deer and chukar are crossed by Route Segment 3b. The Hanford Reach supports the larger of the only two remaining healthy naturally spawning fall Chinook salmon populations in the Columbia River System (Nugent et al. 2002). Route Segment 3b parallels the Hanford Reach for 2.7 miles to the Priest Rapids Dam.

Route Segment 3c (Agency Preferred Alternative)
Sagebrush habitats with an understory of perennial and annual grasses occur along Route Segment 3c. Several sensitive species occur along this route. Black-tailed jackrabbits occur near the Vantage Substation and the striped whipsnake has been documented in sagebrush habitats north of Lower Crab Creek. The southern portion of this route crosses agricultural croplands, including orchards, vineyards and row crops. Route Segment 3c parallels the Columbia River below Priest Rapids dam for approximately three miles would cross the Columbia River approximately five miles below Priest Rapids Dam. Sensitive species occurring near the Columbia River include chukar, nightsnake, prairie falcon and peregrine falcon. This route segment parallels and crosses the Columbia River at Vernita Bar, gravel bars critical to fall Chinook salmon spawning (Nugent et al. 2002). Habitats utilized by chucker, prairie falcon and golden eagle are crossed near Lower Crab Creek, which as some emergent riparian vegetation associated with it.

The majority of Route Segment 3c is within the Occasionally Occupied Habitat (Tier 3) unit for sage-grouse, with remaining occurring in Tier 1, Regularly Occupied Habitat and Tier 4, Expansion Habitat. No sage-grouse leks are known to occur within three miles of this route segment. Sage-grouse have been documented (approximately four observations) within 0.5 mile of Route Segment 3c since 1988.

3.4 LAND JURISDICTION AND LAND USE

This section characterizes the uses and jurisdiction of land in the Project area in south-central Washington. The purpose of the land use analysis is to inventory land uses and to assess the potential land use impacts of each of the alternative route segments. Data was compiled for land uses and jurisdiction within a two-mile wide study corridor (Project area), one mile on either side of the assumed centerline of each alternative route segment. The Project area includes the northwest part of Yakima County south of and adjacent to the Joint Base Lewis-McChord Yakima Training Center (JBLM YTC), the northwestern corner of Benton County, the southwest corner of Grant County, and the southeast corner of Kittitas County. Appendix A – Map 6: Jurisdiction, Recreation, and Special Management Areas shows land jurisdiction in the Project area. Appendix A – Map 7: Land Use shows existing land use. Land uses and jurisdictions were identified and characterized within one mile either side of each route segment. Refer to Appendix A: Land Use, and Jurisdiction, Recreation, and Special Management Areas.

The analysis considered issues related to land use in the Project area raised during the public scoping process, which occurred during January and February of 2010 and January of 2011. Scoping comments included general concerns for impacts on agricultural operations such as the potential loss of farmable acreage, impacts on irrigation operations, aerial spraying and helicopter drying of crops, induced electrical currents, impacts on state land agricultural leases and state trust land management activities. Concerns were also raised regarding impact on organic certification and interference with wind displacement devices that inhibit crop freezing. These comments were considered during data collection and analysis of land uses within the Project area.

3.4.1 Data Sources

Land use data were collected for each zone. Information for the inventory was obtained from various federal, state, and local agencies, including the following:

- U.S. Environmental Protection Agency (EPA) National Priority List (NPL) website database
- U.S. Department of the Army (Army) – Final Environmental Impact Statement (EIS) for the Fort Lewis Army Growth and Force Structure Realignment (July 2010)
- Bureau of Land Management (BLM) – Spokane Resource Management Plan (RMP) – Rangeland Program Summary Record of Decision (ROD) (1987)
- BLM – Proposed Spokane RMP Amendment Final ROD (1992)
- BLM – ROD for the Spokane RMP Amendment (1992)
- BLM – Analysis of the Management Situation for the Eastern Washington and San Juan RMP (BLM 2011)
- Washington State Department of Agriculture – Agricultural Land Use Database
- Washington State Department of Natural Resources Map of Public Trust Lands (2010)
- Washington State Department of Ecology Toxic Cleanup program website database
- Benton County Comprehensive Land Use Plan (2006, amended 2009)
- Kittitas County Comprehensive Plan (2010)
- Grant County Comprehensive Plan (2006, amended 2010)
- Yakima County "Plan 2015" Comprehensive Plan (2007)
- Grant County Public Utility District No. 2 Priest Rapids/Wanapum Land Use Plan (1992)
- Grant County Public Utility District Shoreline Management Plan (2010)
- Public Land Information System (GIS database)
- Field Reconnaissance of the Project area (May 2011)

3.4.2 Current Conditions and Trends, Regional Overview

3.4.2.1 Land Jurisdiction

Land jurisdiction refers to the limits of administrative authority maintained by a federal, state, or local governmental agency or organization. Jurisdiction does not necessarily imply land ownership. Three predominant categories of jurisdictions inventoried within the study area (federal, state, and local) are described in this section and presented in Table 3.4-1.

Federal

Lands administered by the federal government in the Project area include:

- BLM
- Bureau of Reclamation (Reclamation)
- U.S. Fish and Wildlife Service (USFWS)
- JBLM YTC
- U.S. Department of Energy (DOE)

State

Lands administered by the state of Washington government in the Project area include:

- Washington Department of Natural Resources (WDNR)
- Washington Department of Fish and Wildlife (WDFW)

Local

- Yakima County
- Grant County
- Benton County
- Kittitas County

Yakima County

Yakima County is the second largest county in the state by area. The county is bordered by Benton County to the east, Klickitat County to the south, Skamania, Lewis, and Pierce Counties to the west, and Kittitas County to the north. The City of Yakima, located in proximity to the western part of the Project area, is the County Seat. The southern part of the Army's JBLM YTC is located in the northeast part of the county. Route segments are generally located in the central part of the county between State Route 24 and the southern and eastern boundaries of JBLM YTC.

Grant County

The fourth largest county in the state, Grant County is approximately 2,675 square miles in area and is bordered on the west by Douglas and Kittitas Counties, on the south by Yakima and Benton counties, on the north by Okanogan County, and on the east by Adams County. The Columbia River flows in a deep valley along the west and southwestern boundary of the County. The City of Ephrata located outside of the Project area in the central part of the County is the County Seat.

Prominent features in the Project area include the Saddle Mountains, Lower Crab Creek and Wahluke Slope. The Wahluke Slope is a highly productive agricultural area of cultivated irrigated farmland south of the Saddle Mountains and north and east of the Columbia River. Saddle Mountains is a BLM-managed area with a number of allowable uses, including grazing, high voltage transmission lines and recreation. Lower Crab Creek is a waterway that drains into the Columbia River that provides riparian habitat and is part of the state-managed Columbia Basin Wildlife Area.

Benton County

Benton County is home to the DOE's Hanford Site and well as parts of the Hanford Reach National Monument. The City of Prosser located outside of the Project area in the west-central part of the county is the County Seat. A route segment is located in a small unpopulated area of the northwestern corner of Benton County.

Kittitas County

Kittitas County is located at the geographic center of Washington State. Route segments are located in a small area of southeastern Kittitas County south of Interstate 90 (I-90) between the Yakima Training Center and Columbia River. The City of Ellensburg, located outside of the Project area in the central part of the Kittitas County, is the County Seat.

TABLE 3.4-1 LAND OWNERSHIP AND JURISDICTION IN PROJECT AREA

LAND JURISDICTION	AREA (ACRES)	% OF PROJECT AREA (TWO MILE CORRIDOR)
Total Area (2-mile Corridor)	**126,349**	**100**
Private	76,690	60.7
Yakima County	48,941	38.7
Grant County	21,398	16.9
Benton County	3,033	2.4
Kittitas County	3,317	2.6
Federal	43,580	34.5
Bureau of Land Management (BLM)	9,269	7.3
Bureau of Reclamation (Reclamation)	6,513	5.2
U.S. Department of Army – Joint Base Lewis-McChord-Yakima Training Center (JBLM YTC)	630	0.5
U.S. Fish and Wildlife Service (USFWS)	987	0.8
Department of Defense (DOD)	26,181	20.7
State	6,078	4.8
Department of Fish & Wildlife (WDFW)	1,110	0.9
Department of Natural Resources (WDNR)	4,968	3.9

3.4.2.2 Existing and Planned Land Use

The Project area contains portions of Yakima, Grant, Benton, and Kittitas Counties in Washington. Mattawa is the only incorporated city in the three analysis zones. Unincorporated communities in the Project area include Beverly, Schawana, Wanapum Village and Desert Aire. The Grant County Public Utility District (PUD) is a nonprofit municipal corporation providing electric and communication services within its district. The Grant County PUD operates the Priest Rapids Project consisting of two hydroelectric facilities on the Columbia River in the Project area (Wanapum Dam, Priest Rapids Dam) and other project-related facilities, and recreation areas on or in proximity to the river. Federal and state agencies also manage land in the Project area and include:

Federal

- Army-JBLM YTC
- Department of the Interior
    - BLM-Saddle Mountains Management Area (Saddle Mountains MA) in Grant County; other parcels across the Project area

- USFWS-Columbia National Wildlife Refuge, Hanford Reach National Monument
- Reclamation-land parcels and irrigation canals predominantly in Grant County

State

- Department of Transportation (State Routes 24 and 243)
- Department of Fish and Wildlife (Columbia Basin Wildlife Area-Lower Crab Creek Unit and Priest Rapids Unit)
- Department of Natural Resources (State Trust lands)

3.4.2.3 Residential

Residences are predominantly single-family detached housing units in the Project area. Communities with more densely populated areas include the City of Mattawa as well as the unincorporated communities of Desert Aire, Beverly, Wanapum Village and Schawana. Other residential areas are generally associated with farms and rural living, and are scattered throughout the Project area.

3.4.2.4 Commercial, Public, Industrial

Mattawa has a number of retail businesses and government service facilities in the community. Industrial-type businesses and activities occurring in the Project area are associated with light industry and agricultural processing, including food storage and processing facilities associated with large-scale agriculture. The City of Yakima, just outside of the western part of the Project area, is the Yakima County seat, a regional business center with a number of commercial and industrial businesses as well as government service facilities.

3.4.2.5 Linear Facilities (Transmission/distribution lines, pipelines, canals, etc.)

An important factor in siting the alternative routes was to use opportunities to parallel existing linear features in order to be compatible with existing land uses. Existing linear and curvilinear features within the study area include transmission lines, major highways, abandoned railroads (Chicago, Milwaukee, St. Paul, and Pacific [C, M, SP, & P]), property lines, and irrigation canals.

The BLM Spokane District Resource Management Plan (1985) and Record of Decision (1987) and the 1992 Resource Management Plan Amendment and Record of Decision (Spokane District 1985/1987 RMP and 1992 RMP Amendment/ROD) designated a minimum 200-foot wide utility corridor in the Saddle Mountains for Bonneville Power Administration's (BPA) power lines (BPA Schultz-Wautoma 500 kilovolt (kV); BPA Vantage-Midway 230 kV; BPA Grand Coulee-Midway 230 kV; BPA Pot Holes-Midway 230 kV). There are no other designated utility corridors in the Project area.

The BPA Vantage Substation is located on the north end of the Project. Other corridors and major rights-of-way (ROWs) in the Project area include:

- Pomona-Wanapum 230 kV transmission line (PacifiCorp)
- Ellensburg-Moxee #1 115 kV transmission line (BPA)
- Midway-Moxee 115 kV transmission line (BPA)
- Union Gap-Midway 230 kV transmission line (PacifiCorp)
- Priest Rapids-Midway 230 kV transmission line corridor (Grant County PUD)
- Vantage-Midway 230 kV transmission line (BPA)
- Priest Rapids-Vantage 230 kV transmission line (Grant County PUD)
- Wanapum-Wind Ridge 230 kV transmission line (Puget Sound Energy)
- Schultz-Wautoma 500 kV transmission line (BPA)

- Hanford-Vantage #1 500 kV transmission line (BPA)
- Vantage-Walla Walla 230 kV transmission line (PacifiCorp)
- Columbia-Vantage 230 kV transmission line corridor (BPA)
- Wanapum-Wind Ridge 230 kV transmission line (Puget Sound Energy)
- Schultz-Vantage 500 kV transmission line (BPA)
- Schultz-Wanapum 500 kV transmission line (BPA)
- State Route 243
- State Route 24
- Abandoned C, M, SP, & P railroad ROW in proximity to the east and southern shorelines of the Columbia River (Yakima, Kittitas and Benton Counties)

3.4.2.6 Agriculture

Farming is a prominent way of life and land use activity in the Project area. Fruit trees, vineyards, and row crops are cultivated in the Project area in Kittitas, Grant, and Yakima Counties. A network of irrigation water conveyance structures traverse the Project area to connect to irrigation systems such as center pivots and wheel-line systems that provide water to these farms. Apple and cherry orchards are grown in the Kittitas County and Benton County portions of the Project area. Fruit tree orchards, vineyards and row crops are all cultivated in Grant and Yakima Counties in the Project area.

Specific crops grown in the study area include:

- Wine Grapes
- Concord Grapes
- Apples
- Apricots
- Hops
- Nectarines/Peaches
- Cherries
- Hay (Alfalfa, Timothy, and Grass)
- Asparagus
- Field Corn
- Mint
- Pear
- Green Pea
- Onions
- Potatoes
- Wheat
- Blueberries
- Wildlife Feed

According to the Washington Wine Commission, the entire Project area is located in two designated American Viticultural Areas (Columbia Gorge, Wahluke Slope). Viticultural areas are a federally-recognized wine growing region and are codified in the Code of Federal Regulations (C.F.R.), Title 27 Part 9.

Management of agricultural lands includes the use of global positioning system (GPS) guided equipment and vehicles, and equipment used for irrigation, aerial and ground based spraying, aerial drying of cherry orchards using helicopters, mechanical plowing, seeding, fertilizing, and harvesting. Some of the equipment may be between 15 feet and 40 feet in height, and may not be compatible with the transmission line conductors or structures. Typical farm equipment that may be used in the Project area includes combines with antennae, combines with hopper extensions, and tractors with antennas. Other equipment, such as sprayers, augers and cultivators in transit on trailers, silage dump wagons, and end dump truck with inclined box may also be used in the study area.

Irrigated Agricultural Systems
Specific irrigation methods utilized in the Project area include circle (center pivot), hand movable sprinkler line, wheel line, drip, big gun and flood. Sprinkler irrigation usually provides a more even distribution of water than other methods and can be used on rolling topography. Flood irrigation entails spreading water over a unit of land. Border dikes, cross-ditches, or water spreading systems are used to control the water. Center pivot systems may utilize articulated arms to irrigate field corners. Articulated systems are more easily adaptable because they can avoid or bend around transmission structures.

Appendix A-Map 9a through 9E: Existing Agriculture and Irrigation shows crop types and irrigation methods in study area. A summary of crop types and irrigation methods within the Project area is shown in Table 3.4-2 below. Figures 3.4-1 through 3.4-7 show some of the predominant irrigation systems in use in the Project area.

Reclamation's Columbia Basin Project provides the vast majority of irrigation to agricultural areas in the Project area. The Columbia Basin Project covers the study area in Grant County. Irrigation is also provided by groundwater or direct withdrawal from surface waters (e.g., Columbia River, Yakima River) in the study area (in Yakima County), and commonly delivered through a network of feeder canals, storage ponds, open ditches and buried pipes. Excess water is drained through a system of wastewater ditches (wasteways; see Figure 3.4-8). Buried and surface main irrigation lines and laterals are prevalent in Grant County, Reclamation maintains a system of roads to access the irrigation infrastructure. The existing irrigation infrastructure is shown in Appendix A: Map 9 Existing Agriculture and Irrigation.

FIGURE 3.4-1 CENTER PIVOT (CIRCLE) IRRIGATION SYSTEM UTILIZED IN PROJECT AREA

FIGURE 3.4-2 ARTICULATED CENTER PIVOT IRRIGATION SYSTEM UTILIZED IN PROJECT AREA

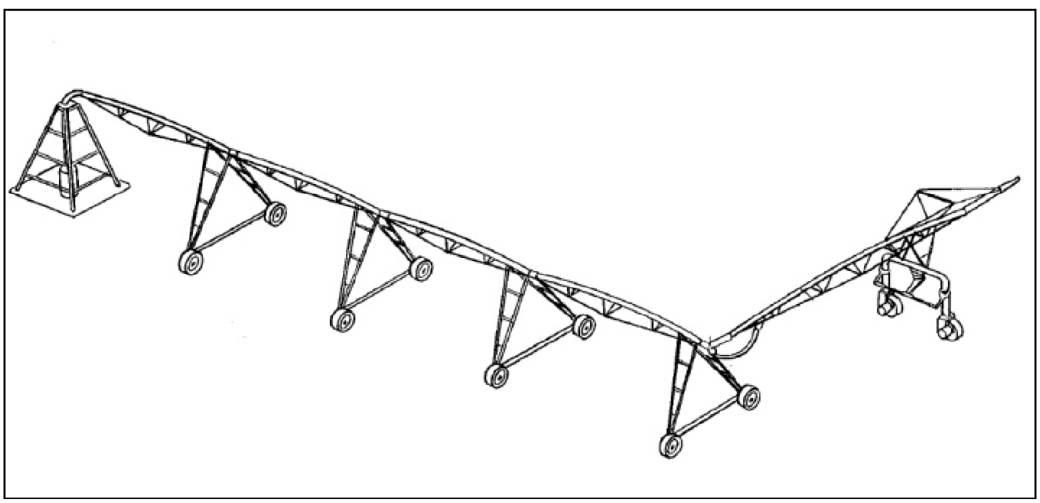

FIGURE 3.4-3 ARTICULATED PIVOT SYSTEM ILLUSTRATION

FIGURE 3.4-4 WHEEL LINE IRRIGATION SYSTEM UTILIZED IN PROJECT AREA

FIGURE 3.4-5 WHEEL LINE IRRIGATION SYSTEM UTILIZED IN PROJECT AREA

FIGURE 3.4-6 SPRINKLER IRRIGATION SYSTEM UTILIZED IN PROJECT AREA

FIGURE 3.4-7 DRIP IRRIGATION SYSTEM UTILIZED IN PROJECT AREA

FIGURE 3.4-8 EXISTING IRRIGATION CANAL IN PROJECT AREA

TABLE 3.4-2 CROP TYPES AND IRRIGATION METHODS IN PROJECT AREA

CROP TYPE	IRRIGATION METHOD	# ACRES IN TWO-MILE CORRIDOR
Alfalfa Hay	Center Pivot	1202.4
	Hand-Movable Sprinkler	13.2
	Wheel Line	223.2
	Alfalfa Hay Total	**1,438.8**
Alfalfa/ Grass Hay	Wheel Line	20.4
Apple	Center Pivot	297.8
	Drip	227.5
	Dryland	54.7
	Hand-Movable Sprinkler	3,868.4
	Unknown	148.9
	Apple Total	**4,597.3**
Apricot	Hand-Movable Sprinkler	85.0
Asparagus	Center Pivot	67.2
	Wheel Line	57.4
	Asparagus Total	**124.6**
Blueberry	Drip	14.4
Cherry	Drip	48.0
	Hand-Movable Sprinkler	531.5
	Unknown	21.4

CROP TYPE	IRRIGATION METHOD	# ACRES IN TWO-MILE CORRIDOR
	Cherry Total	**600.9**
Corn, Field	Center Pivot	739.2
CRP Lands	Dryland	3,367.1
Fallow	Center Pivot	101.2
	Dryland	304.2
	Hand-Movable Sprinkler	80.9
	Wheel Line	21.5
	Fallow Total	**507.8**
Feed Lot	NA	60.3
Grape, Wine	Center Pivot	117.3
	Drip	226.8
	Hand-Movable Sprinkler	1,325.1
	Unknown	346.5
	Grape, Wine Total	**2,015.7**
Grapes, Concord	Hand-Movable Sprinkler	60.6
Grass Hay	Center Pivot	197.5
	Hand-Movable Sprinkler	7.6
	Unknown	16.5
	Grass Hay Total	**221.6**
Hops	Drip	163.7
Mint	Center Pivot	131.6
Nectarine/Peach	Hand-Movable Sprinkler	2.6
Onion	Center Pivot	75.9
Pasture	Big Gun	22.4
	Flood	25.8
	Dryland	38.0
	Hand-Movable Sprinkler	61.9
	Wheel Line	82.7
	Pasture Total	**230.8**
Pea, Green	Center Pivot	613.7
Pear	Hand-Movable Sprinkler	21.4
Potato	Center Pivot	421.3
Timothy	Center Pivot	1,978.2
	Unknown	10.3
	Timothy Total	**1,988.5**
Wheat	Center Pivot	819.8
	Dryland	193.6
	Unknown	100.5
	Wheel Line	164.6
	Fallow/Dryland	864.5

CROP TYPE	IRRIGATION METHOD	# ACRES IN TWO-MILE CORRIDOR
	Wheat Total	**1,323.2**
Wildlife Feed	Dryland	300.1

Organic farming occurs in the Project area also. The U.S. Department of Agriculture's (USDA) National Organic Standards certifies organic crops and establishes the requirements of the National Organic Program (NOP) for organic crop production including land management, seed and planting stock, crop rotation and pest management. The USDA's NOP Final Rule contains the general requirements for certification (7 C.F.R. 205). The producer or handler of a production or handling operation intending to sell, label, or represent agricultural products as “100 percent organic,” “organic,” or “made with organic (specified ingredients or food group(s))” must comply with the applicable provisions of NOP. The physical presence of a transmission line would not affect organic certification but spot spraying for weeds along the transmission line during maintenance could potentially impact organic crops due to overspray.

Prime and Unique Farmland and Farmland of Statewide Importance

In 1981, Congress passed the Agriculture and Food Act of 1981 (Public Law 97-98) containing the Farmland Protection Policy Act (FPPA). The FPPA is intended to minimize the impact federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. For the purpose of FPPA, farmland includes prime farmland, unique farmland, and land of statewide or local importance. Farmland subject to FPPA requirements does not have to be currently used for cropland. It can be forest land, pastureland, cropland, or other land, but not water or urban built-up land. Projects are subject to FPPA requirements if they may irreversibly convert farmland (directly or indirectly) to nonagricultural use and are completed by a Federal agency or with assistance from a federal agency. The assessment is completed on form AD-1006, Farmland Conversion Impact Rating. Lands may also be classified by the FPPA as Farmland of Statewide Importance, determined by Washington State, that are lands other than prime and unique that is used for the production of feed, food, fiber, forage or oilseed crops.

Conservation Reserve Program

The USDA manages the Conservation Reserve Program (CRP), which provides technical and financial assistance to eligible farmers and ranchers to address soil, water, and related natural resource concerns on their lands in an environmentally beneficial and cost-effective manner. This voluntary program provides assistance to farmers and ranchers in complying with federal, state, and tribal environmental laws, and encourages environmental enhancement. The CRP reduces soil erosion, protects the Nation's ability to produce food and fiber, reduces sedimentation in streams and lakes, improves water quality, establishes wildlife habitat, and enhances forest and wetland resources. It encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover, such as tame or native grasses, wildlife plantings, trees, filterstrips, or riparian buffers. Farmers receive an annual rental payment for the term of the multi-year contract. Cost sharing is provided to establish the vegetative cover practices. The 2008 Farm Bill prohibits the release of CRP participation data specific to parcels unless specific written permission is granted from the landowners who are in the program. The USDA can then provide information. A Memorandum of Agreement (MOA) between Natural Resources Conservation Service (NRCS), Farm Service Agency (FSA), and Commodity Credit Corporation (CCC) in carrying out the CRP is in effect until December 31, 2012. Data obtained from the Washington State Department of Agriculture provides information regarding CRP lands specific to Public Land Survey System (PLSS) sections (acres per section). Known CRP Lands in the Project area for each PLSS section where CRP lands occur are shown in Appendix A-Map 9a through 9e: Existing Agriculture and Irrigation.

3.4.2.7 Rangeland

Livestock grazing on rangelands is another land use occurring on public and private lands in Yakima and Grant Counties in the Project area. BLM has authorized four grazing leases on public lands it manages in the Project area. The WDNR has authorized seven grazing leases on its public trust lands. There is one grazing lease on Reclamation land in the Project area. Table 3.4-3 shows the public lands grazing lease information in the Project area. Cattle yard and feed operations (feedlot) also occur in the study area. A cattle feed yard is located on Road O SW extension north of Road 24 SW.

TABLE 3.4-3 PUBLIC LANDS AND GRAZING LEASES

Bureau of Land Management				
Allotment #	**Authorization #**	**Category of Lease Holder**	**Sections in Study Area**	**Total Allotment Acreage/AUMS***
20806	3600806	Individual	T.15N, R. 23E, Secs. 11, 12, and 13 (all); Section 24 (N1/2) T.15N. R. 24E, Sections 7, 8, 13, 14, 16, and 21 (all); Secs. 6 (lots 6,7; E1/2SW1/4, SE1/4), Sec 10 (W1/2E1/2, SW1/4), Sec. 12 (N1/2, SW1/4), Sec. 18 (lots 1,2,3,4, E1/2W1/2, E1/2), Sec 20 (N1/2, N1/2S1/2), Sec. 22 (N1/2, N1/2S1/2), Sec. 24: (N1/2) Reclamation Lands: T.15N., R.23E, Sec. 24: N1/2SW1/4 T.15N., R.24E Sec. 19: N1/2, N1/2S1/2, Sec. 19: S1/2SE1/4, SE1/4SW1/4, Lot 4, Sec. 25: Portion north of Wahluke Canal, Sec. 26: NE1/4, S1/2, Portion north of Wahluke Canal, Sec. 27: Portion north of Wahluke Canal, Sec. 35: Portion north of Wahluke Canal T.15N., R.24E Sec. 20: S1/2S1/2, Sec. 22: S1/2S1/2, Sec. 24: S1/2	15,467.23 ac./18387 AUMs (Includes Acreage and AMUs not in study area) Reclamation Land include 2,760.02 ac./208 AUMs (Includes Acreage and AMUs not in study area)
10822	3600822	Company	T.12N., R.21E, Sec. 4 fraction of N1/2, SE1/4, E1/2SW1/4; Sec. 10 (all) TT.12N., R.22E, Sec. 18: E1/2 T.13N., R.21E, Sec. 32: N1/2NW1/4, E1/2SE1/4, Sec. 34: W1/2 T.13N., R.24E, Sec. 18: N1/2NE1/4, SE1/4NE1/4, NE1/4SE1/4; Sec. 20: E1/2SE1/4; Sec. 22: W1/2SW1/4, SE1/4SW1/4	2,394.78 ac./341 AUMs (Includes Acreage and AMUs not in study area)
10826	3600823	Individual	T.12N., R.23E, Sec. 2 (S1/2); Sec. 10 (NE1/4, NE1/4NW1/4); Sec. 12 (NW1/4NW1/4, NE1/4, E1/2SE1/4, NE1/4NW1/4)	840 ac./118 AUMs (Includes Acreage and AMUs not in study area)
10823	3600826	Individual	T.12N., R.22E, Sec. 12 (W1/2, SE1/4) T.12N., R.23E, Sec. 2 (Lots 1,2,3,4, S1/2N1/2); Sec. 14 (N1/2)	1111.86 ac./160 AUMs

Bureau of Reclamation				
Grazing File #			**Sections in Study Area**	**Total Allotment Acreage/AUMs***
0806			T.15N., R.23E, Sec. 24: N1/2SW1/4 T.15N., R.24E Sec. 19: N1/2, N1/2S1/2, Sec. 19: S1/2SE1/4, SE1/4SW1/4, Lot 4, Sec. 25: Portion north of Wahluke Canal, Sec. 26: NE1/4, S1/2, Portion north of Wahluke Canal, Sec. 27: Portion north of Wahluke Canal, Sec. 35: Portion north of Wahluke Canal T.15N., R.24E Sec. 20: S1/2S1/2, Sec. 22: S1/2S1/2, Sec. 24: S1/2	2,760.02 ac./208 AUMs (Includes Acreage and AMUs not in study area)

Washington Department of Natural Resources		
Lease Number & Type	**Category of Lease Holder**	**Sections in Study Area (Parcel Number)**
10-A56812 Grazing, Re-Lease Orchard/Grazing 12-B56812	Company	T.13N, R.24E Sec. 16 (3757) T.14N, R.23E Sec. 05 T.14N, R.23E Sec. 09 T.15N, R.23E Sec. 28 T.15N, R.23E Sec. 29 T.15N, R.23E Sec. 32 T.15N, R.23E Sec. 33 T.16N, R.23E Sec. 25
10-A71955 Grazing	Fish & Wildlife Dept	T.16N, R.23E Sec. 36 (14777, 14778 & 5364)
10-A55580 Grazing	Individual	T.13N, R.20E Sec. 36 (10811)
10-A60748 Grazing	Company	T.13N, R.21E Sec. 36 (10824)
10-074092 Grazing	Individual	T.12N, R.22E Sec. 30 (10850)
10-A68468 Grazing	Company	T.12N, R.23E Sec. 16 (10875)
10-A52973 Grazing	Company	T.13N, R.23E Sec. 36 (10877)

*AUMs (animal unit months)=BLM unit of measure of the amount of forage needed to sustain one cow and her calf for a month; Acres=ac.

3.4.2.8 Yakima Training Center

The Project area includes eastern, southern and southwestern areas of the JBLM YTC. JBLM YTC is a sub-installation of Joint Base Lewis-McChord (U.S. Army's Fort Lewis and U.S. Air Force's McChord Air Force Base, both near Tacoma). JBLM YTC supports a diverse training mission to include conventional and tactical weapons delivery, armored maneuver and live-fire, artillery (and other large caliber weapons) fire, small arms capabilities, and rotary-winged and fighter aircraft maneuvers. The military installation includes numerous areas for training as well as a cantonment area where the majority of the installation's barracks (there are no family housing facilities or schools on JBLM YTC), shopping and recreation facilities, and military unit administrative and equipment storage areas are located.

3.4.2.9 Public and Private Airports/Airstrips

There is one public airport and one private airstrip in the Project area. Desert Aire Airport is a privately owned, public use airport with a 3,666 foot by 36 foot paved runway located in the Desert Aire community between the Columbia River and State Route 43. The airport accommodates general aviation (non-commercial) flight operations.

A paved airstrip exists on private land located northwest of and adjacent to the shoreline of Nunnally Lake and the WDFW's Columbia Basin Wildlife Area (Lower Crab Creek Unit).

3.4.2.10 Other Land Use Considerations

Other Leases on Public Lands
Public land management agencies lease land for a number of reasons such as oil and gas exploration, mining, grazing, and utility ROW. According to the WDNR, there are no oil and natural gas leases on state public trust lands. Besides portions of the western Saddle Mountains MA public lands for which the BLM only holds a portion of the mineral estate, and except as noted below, all of the public lands crossed by the route segments are generally available for competitive oil and gas leasing and mineral sales. Because of the lack of locatable minerals on BLM lands in the Project study area (those minerals that are uncommon because they possess a special and distinct value), these lands are rarely subject to mining claim filing. Although the BLM lands have potential for saleable minerals (those minerals that are some of our most basic natural resources, such as sand, gravel, dirt, and rock, used in every day building, and other construction uses), there are no current mineral materials sales contracts or free use permits (issued to government entities) on these lands. Table 3.4-4 shows non-grazing public land leasing information in the Project area. In some locations, multiple leases exist for different purposes. Reclamation leases its lands in the Project area primarily for power line easements. Other leases are shown in Table 3.4-4.

TABLE 3.4-4 PUBLIC LAND LEASES (NON-GRAZING ACTIVITIES)

Bureau of Land Management	
Identifier and Lease Type	**Public Lands Location (Township/Range/Section)**
-WAW 0385: ROW for buried waterline (for livestock watering) issued to Individual -WAW 04773: ROW for Grant County PUD buried distribution line and use of access road WAW-05285: ROW for BPA 230 kV Midway-Vantage transmission line -WAW 05791: ROW for BPA microwave site -WAW 05880: ROW for 500 kV Hanford-Vantage transmission line -WAOR 17523: easement to BLM from Burlington Northern Railroad for access road -WAOR 55024: ROW to Energy Northwest for access roads to tower sites on BPA's Midway-Vantage transmission line -WAOR 57112: ROW issued to BPA for Schultz-Wautoma 500 kV transmission line	T.15N., R.23E, Sections 12 & 13
-WAW 05045:ROW for BPA access road -WAOR 8634: ROW for Pacific Power 230 kV Pomona-Wanapum transmission line -WAOR 45722: ROW for Puget Sound Power 230 kV transmission line -WAOR 55771: ROW for Kittitas County PUD 34.5 kV transmission line -WAOR 59673: oil and gas lease to Delta Petroleum et al.	T.16N, R.23E, Section 20
-WAW 05880: ROW for BPA 500 kV Hanford-Vantage transmission line -WAOR 17388: ROW for United Telephone microwave reflector -WAOR 40183: ROW for Grant Co. PUD 7.62 kV aerial electric distribution line -WAOR 66279: oil and gas lease to individual	T.15N, R.24E, Sections 18, 20, 21, 22

Identifier and Lease Type	Public Lands Location (Township/Range/Section)
-WAOR 63043: Wind testing and monitoring area ROW, including authorization for placement of meteorological towers	T.15N, R.23E, Sec. 11: SE1/4, Sec. 12 (all), Sec. 13 (all), Sec. 14: E1/2, Sec. 24: N1/2 T.15N, R.24E, Sec. 6: S1/2NE1/4, SE1/4NW1/4, E1/2SW1/4, SE1/4, Lots 1-7; Sec. 7: E1/2, E1/2W1/2, Lots 1 - 4; , Sec. 8: (all), Sec. 10: W1/2E1/2, SW1/4, Sec. 12: N1/2, SW1/4, Sec. 13: (all), Sec. 14: (all), Sec. 16: (all), Sec. 18: E1/2, E1/2W1/2, Lots 1-4, Sec. 20: N1/2, N1/2S1/2, Sec. 21 (all), Sec. 22: N1/2, N1/2S1/2, Sec. 24: N1/2.

State of Washington

Lease Number & Type	Lease Holders Name	Sections in Study Area (Parcel Number)
50-024853 – Overflow	Grant County PUD 2	T.16N 23E 3 (5364)
92-081996 – Irrigation Agreement	Company	T.13N 24E 05 (112223 & 112224)
12-081077 – Orchard	Company	T.13N 24E 05 (112223 & 112224)
12-A63615 – Irrigated Agriculture	Company	T.12N 21E 16 (10822)
50-081957 – Irrigation System	Company	T. 13N 24E 05 (112223 & 112224)
92-081996 – Irrigation Agreement	Company	T. 13N 24E 05 (112223 & 112224)
59-061072 – Public Outdoor Recreation	WA State Interagency Com Outdoor Rec	T. 16N 23E 37 (5364)
50-048713 – Trail	WA State Interagency Com Outdoor Rec	T. 16N 23E 37 (14778)
50-004152 – Railroad ROW	Chicago, Milwaukee, St. Paul, & Pacific Railway	T. 16N 23E 36
50-010190 – Railroad ROW	Chicago, Milwaukee, St. Paul, & Pacific Railway	T. 16N 23E 36
43-081677– Utilities ROW	Puget Sound Power & Light	T. 16N 23E 37
50-CR2341– Road ROW	Grant County	T. 16N 23E 37
50-081950 – Road ROW	Grant County	T. 13N 24E 05
50-081954 – Electric Trans Line	Grant County PUD 2	T. 13N 24E 05
50-081956 – Elec Trans Line & Road	Grant County PUD 2	T. 13N 24E 05
50-081960 – Utility & Road	Grant County PUD 2	T. 13N 24E 05
50-081962 – Elec Trans Line & Cable	Grant County PUD 2	T. 13N 24E 05
50-081963 – Elec Trans & Road	Grant County PUD 2	T. 13N 24E 05
50-081964 – Elec Trans Line, Cable & Road	Grant County PUD 2	T. 13N 24E 05
50-081967– Elec Trans Line & Cable	Grant County PUD 2	T. 13N 24E 05
50-081968 – Telecomm Cable & Road	Company	T. 13N 24E 05
50-081970 – Elec Trans & Road	Grant County PUD 2	T. 13N 24E 05
50-081981 – Water Pipe & Road	Stemilt Associates	T. 13N 24E 05
50-040234 – Road r/w	Yakima Sheep Co.	T. 13N 20E 06
50-016800 – Electric Trans Line	Bonneville Power Administration	T. 12N 21E 16
50-032867– Electric Trans Line	Benton Rural Electric Association	T. 12N 21E 16
50-003009 –Road ROW	Yakima County	T. 12N 21E 16
50-025626 – Electric Trans Line	Pacific Power & Light Company	T. 12N 22E 30

Lease Number & Type	Lease Holders Name	Sections in Study Area (Parcel Number)
50-047843 – Road ROW	Anderson Ranches	T. 12N 22E 30
50-013711 – Electric Trans Line	Pacific Power & Light Company	T. 12N 22E 30
50-016776 – Electric Trans Line	Bonneville Power Administration	T. 12N 22E 30
50-024287 – Electric Trans Line	Benton Rural Electric Association	T. 12N 22E 30
50-025627– Electric Trans Line	Pacific Power & Light Company	T. 12N 22E 30
50-045906 – Distribution Cable	Benton Rural Electric Association	T. 12N 22E 30

Bureau of Reclamation	
Description	**Sections in Study Area**
	T. 13N, R.24E
Midway Line – Grand Coulee; Remaining parcels transferred to AEC	Section 2
Midway Line – Columbia Mattawa Drain – Reclamation Facility	Section 3
Grant County Material Site	Section 4
880 feet River Network Contract 6-7-16-L3005	Section 8 - N1/2NE1/4
Material Site License to Washington State 9-17-67-7955t14, Lots 1 through 4 to AEC	Section 10
Lots 1 and 2 to AEC	Section 11
	T. 14N, R.24E
Midway Grand Coulee Power Line	Section 2
Midway Grand Coulee Power Line Proposed N.P. Railroad 100 foot ROW, no documentation that this was ever developed further.	Section 3
Midway Grand Coulee Power Line	Section 11
Midway Grand Coulee Power Line	Section 23
	T. 15N, R.23E
Facility only	Section 22
	T. 15N, R.24E
Access Road easement W1/2NW1/4 Grant County PUD power line W1/2NW1/4	Section 27
Administered by Washington State Department of Fish and Wildlife.	Section 29
	T. 16N, R.23E
Priest Rapids Transmission Line Hanford-Vantage Transmission Line	T. 16N, R.23E
RB5J Wasteway	Section 10
Substation Transferred to BPA	Section 15
Manage by Grant County PUD in conjunction with their Federal Energy Regulatory Commission (FERC) License	Section 16
Manage by Grant County PUD in conjunction with their FERC License	Section 21
License to Grant County for landfill expired in 1976. No evidence there is a landfill in the area.	Section 22
Road Easement W 30'of the E. 42', Grant County PUD Easement within the w. 42'	Section 23
Railroad Spur line – C.M. St. P. & P – removed, Grant County PUD Easement NW1/2NW1/4SW1/4	Section 27
Manage by Grant County PUD in conjunction with their FERC License	Section 28
Grant County PUD Easement NW1/4SE1/4	Section 35

Sand and Gravel Operations
There are two sand and gravel operations located on the south side of the east-west section of State Route 243 in Grant County. One operation is located where the highway begins to curve in a north-south direction. Another operation is located approximately 3,000 feet west of where the concentration of overhead parallel transmission lines cross the Columbia River into the Midway substation.

In Yakima County, a sand and gravel operation is located north of Roza Hill Road, west of Saint Allaire Road and east of the JBLM YTC boundary.

Superfund and Hazardous Waste Sites
Superfund is the federal government's program to clean up the nation's uncontrolled hazardous waste sites. The program, managed by the Environmental Protection Agency, identifies the sites and places them on NPL for cleanup. A review of the NPL indicated that there are no NPL sites in the Project area. A review of the Washington Department of Ecology Toxics Cleanup Program site information indicated one site (Wolfkill Feed and Fertilizer, now owned by Tatoes, Inc.) is located on the west side of Mattawa but not near any route segments in Grant County. The property was previously used for liquid and dry fertilizer storage distribution. Groundwater samples detected concentrations of chemicals that exceeded state cleanup levels. Restrictions have been placed on the property called a Restrictive Covenant. Groundwater extraction from the site for domestic use is prohibited.

The Hanford Superfund Sites are located in the Hanford Reach National Monument, located approximately 6.2 to 31 miles to the east and southeast of the Project area.

Wind Energy Projects
In June 2010, Horizon Wind Energy NW (now EDP Renewables) concluded three years of wind testing in the Saddle Mountains and submitted an application to the BLM to continue testing for another three years. The second three year term was subsequently approved by the BLM. Horizon also submitted a development application to the BLM for a major wind project (up to 150 turbines) in the western half of the Saddle Mountains on both private and BLM land; however, the BLM has not yet formally accepted the application.

3.4.3 Current Management Considerations

This section describes the general land use management goals and objectives related to transmission lines and utility related infrastructure for the land/resource management agencies in the Project area.

3.4.3.1 Federal

Bureau of Land Management
In the Project area, the Spokane District of the BLM manages public land in Grant, Kittitas, Benton, and Yakima Counties with the Saddle Mountains MA in Grant County constituting one of the larger contiguous areas of BLM managed land in the Project area. The Spokane District manages its land and resources in the Project area using the Spokane District RMP (1985) and ROD (1987) and the 1992 RMP Amendment and ROD. The RMP designated utility corridors on BLM lands, one of which is partially occupied by the Saddle Mountains BPA transmission lines in the Project area (see Appendix A-Map 7: Land Use). No other utility corridors are designated on BLM land in the Project area.

The BLM is in the process of updating the Spokane District 1985/1987 RMP and 1992 RMP Amendment/ROD. It recently published the document "Analysis of the Management Situation for the Eastern Washington and San Juan Resource Management Plan" (BLM 2011) in March 2011 that summarizes existing conditions, trends and management guidance for the planning area. The report states that for utility corridors, additional ROWs will be considered on a case-by-case basis. Applicants would be encouraged to locate new facilities within existing corridors or group compatible facilities to the extent possible.

Yakima Training Center
As defined in the "Final Environmental Impact Statement for the Fort Lewis Army Growth and Force Structure Realignment" (July 2010), to aid in resource management, JBLM YTC is divided into five land use zones (Army 2010). The zone designations identify allowable military training activities and acceptable levels of impact to the resources to maximize military training opportunities, while simultaneously safeguarding resources.

Most forms of training are prohibited in Zone 1 (Land Bank), which is managed for significant and sensitive natural and/or cultural resources. Zone 2 (Conservation) is managed as a sage grouse protection area; however, most forms for training are allowed with the exceptions of digging and bivouacking activities. Zone 3 (General use) comprises 75 percent of JBLM YTC and includes the cantonment area and the primary training ranges. Zone 4 (High Use) accommodates heavy use and high-impact activities such as Brigade Support Areas. Zone 5 (Impact Areas) includes impact and dud areas and the Selah Airstrip.

Zones 2 and 3 are the only JBLM YTC land use zones that would be used or crossed by route segments in the Project area. Zone 3 has no specific protection and management measures other than as described above. Zone 2 is managed in accordance with the Sage Grouse Management Plan (Army 2002) that identifies protection and management measures. As detailed in the plan, excavations in sage grouse protection areas are not permitted (see Section 4.2 of the plan: *Protection of Sage Grouse Habitat*). Refer to Appendix A: Land Use Map for the location of Zone 2 areas.

Training facilities at JBLM YTC support gunnery and maneuver training, including maneuver corridors, impact areas, ranges, drop zones, and bivouac areas. Training exercises at JBLM YTC include foot, motorized, mechanized, and armory infantry maneuvers at the platoon level ($20^{\pm}$ troops) to brigade level (up to 5,000 troops). Live-fire gunnery training is also conducted that includes large caliber tank, Bradley fighting vehicle, and anti-tank missile firing, indirect mortar, and howitzer gunnery. JBLM YTC is also used for air assault, air drop, and special operations gunnery and maneuver.

Training areas (TAs) on the JBLM YTC are delineated into maneuver, impact, range and special use areas. TAs are established to facilitate range management, and are numbered TA-1 through TA-16 according to their geographic location. The proposed Project route segments could potentially cross TA-8, TA-10, TA-11 and TA-13. Training activities are coordinated to preclude damage to sensitive species and habitats. Special use areas include airborne training sites (drop zones), ammunition storage, and equipment storage. Training activities related to land use on JBLM YTC include maneuver events, off-road tracked vehicle movement, wheeled vehicle movement, aerial maneuver and gunnery practice, gunnery practice, digging activities (tank ditches, vehicle positions, and foxholes), unit assembly areas, and river crossing exercises (JBLM YTC 2010). TAs on the JBLM YTC are shown in Appendix A: Land Use Map.

U.S. Fish and Wildlife Service
USFWS managed lands associated with the Columbia National Wildlife Refuge are intermingled within the state's Columbia Wildlife MA-Lower Crab Creek Unit. The purpose of the refuge is to provide habitat and breeding ground for migratory birds and other wildlife. The USFWS is developing a Comprehensive Conservation Plan that will serve as a guide for the Refuge for the next 15 years.

Bureau of Reclamation
The mission of Reclamation is to manage, develop and protect water and related resources in an environmentally and economically sound manner in the interest of the American public. Reclamation manages land and irrigation infrastructure in the Grant and Yakima County sections of the Project area.

Federal Aviation Administration
The Federal Aviation Administration (FAA) has the authority to regulate the safe and efficient use of navigable airspace. Structures that would support the conductors that would cross the Columbia River would be approximately 200 feet tall above ground level for the Project. In accordance with 14 CFR Part 77, Form 7460-1 "Notice of Proposed Construction or Alteration" would need to be filed with the FAA for review and include information about the height and configuration of conductors and structures.

3.4.3.2 State

Washington Department of Natural Resources
The WDNR manages granted trust lands that are located in the Project area. According to the State Trust Lands map, the trust lands in the Project area are managed for the benefit of the state's public schools, universities and other institutions.

Washington Department of Fish and Wildlife
The WDFW manages the Lower Crab Creek and Priest Rapids Units of the Columbia Basin Wildlife Area in Grant County north of the Saddle Mountains and east of the communities of Schawana and Beverly. The wetlands and riparian areas along the creek and the seep ponds and uplands on the bench north of the creek, provide a diverse habitat for many species of wildlife.

3.4.3.3 Local

The Washington State Growth Management Act (GMA) identifies five Critical Areas. Critical areas established in each Washington state county in accordance with RCW 36.70A.170. "Critical areas" include the following areas and ecosystems: (a) wetlands; (b) areas with a critical recharging effect on aquifers used for potable water; (c) fish and wildlife habitat conservation areas; (d) frequently flooded areas; and (e) geologically hazardous areas. Counties that are covered under the GMA are required to protect Critical Areas.

Washington State's Growth Management Act of 1990 (RCW 36.70A)and the Planning Enabling Act (RCW 36.70) requires each planning agency to develop a comprehensive plan for the orderly physical development of the county and areas outside of the county that the planning agency considers important for planning. The four counties in the Project area each have a comprehensive plan. The following describes the key goals and/or objectives in the plans related to land use and utilities, and if specified, the location of transmission lines.

Yakima County
Yakima County's current comprehensive plan, "Plan 2015", describes a vision for Yakima County, including how it should grow, what services are anticipated to accommodate growth and the goals and objectives to achieve the community vision. Policies related to utilities include:

> **Policy UT 2.3:** Assist and facilitate the siting of utility-related infrastructure in a manner consistent with Plan 2015 through land use planning and development review policies and procedures

> **Policy UT 3.1:** Utility services should be provided in accordance with approved utility comprehensive plans that are consistent with future population projects and the preferred land use categories defined by Plan 2015

Yakima County Code, Chapter 15.18 "Permitted, Administrative and Conditional uses" under Title 15 "Zoning" does not specifically indicate whether transmission or power lines were a permitted or a conditional use within the county's zoning classifications. However, an Administrative Type II approval will be required. A Type II or Class 2 use is generally permitted provided that development standards are met and compatibility with neighboring uses and consistency with the County Code can be met. Zoning in Yakima County within the Project area is typically "Agriculture" (AG) and "Remote/Extremely Limited Development Potential" (R/ELDP). Other designations include "Industrial" (I), "Mining" (MIN), and "Valley Rural" (VR). See Appendix A: Zoning Map for zoning designations in the Project area.

The GMA requires counties to develop policies and development regulations to protect the functions and values of critical areas. These are adopted in ordinance and are typically referred to as Critical Areas Ordinances (CAO). Critical areas identified by Yakima County in the study area include "Wetlands", "Critical Aquifer Recharge Areas (CARAs)", "Frequently Flooded Areas", "Geologically Hazardous Areas", and "Fish and Wildlife Habitat Conservation Areas". Crossing of these areas in Yakima County may require a Critical Areas Permit.

Benton County
According to the Benton County Comprehensive Land Use Plan 2006 (amended), planning for utilities should be recognized as the primary responsibility of the utility providers. The county should rely on plans prepared by the utility providers. However, the land use map, plan policies and capital facilities plan of the Comprehensive Plan offer opportunities for providers to improve the quality and cost effectiveness of service to county residents.

A review of the Benton County Code, Title 11 "Zoning" did not indicate whether transmission or power lines were a permitted or a conditional use within the county's zoning classifications. However, a Shoreline Management Substantial Development Permit will be required, subject to Benton County Shoreline Hearing Board approval. Zoning in Benton County within the Project area is designated as GMA Agricultural District. See Appendix A: Zoning Map for zoning designations in the Project area.

The GMA requires counties to develop policies and development regulations to protect the functions and values of critical areas. These are adopted in ordinance and are typically referred to as CAO. Critical areas identified by the Benton County in the study area include "Wetlands", "Rivers and Creeks", "CARAs/Interchange Areas", "Frequently Flooded Areas", "Geologically Hazardous Areas", "Fish and Wildlife Habitat Conservation Areas", and "Mineral Resource Areas". Crossing of these areas in Benton County may require a Critical Areas Permit.

Kittitas County
According to the Kittitas County Comprehensive Plan 2010, the County has a number of Goals, Policies and Objectives (GPO) related to transmission lines:

> **GPO 6.1** The County should promote the joint use of transportation ROWs and other utility corridors consistent with the underlying private property rights and easement limitations.
>
> **GPO 6.2** Appropriately place utility facilities within public ROWs.

GPO 6.6 Expansion and improvement of utility systems should be recognized primarily as the responsibility of the utility providing the corresponding service.

GPO 6.21 Avoid, where possible, routing major electric transmission lines above 55 kV through urban areas.

GPO 6.32 Electric and natural gas transmission and distribution facilities may be sited within and through areas of Kittitas County both inside and outside of municipal boundaries, Urban Growth Areas, Master Planned Resorts, limited area of more intensive rural development and Fully Contained Communities, including to and through rural areas of Kittitas County.

Zoning in Kittitas County within the Project area is typically “Commercial Agriculture” and “Forest and Range”. A review of the Kittitas County Code, Chapter 17.61 “Utilities” indicated that electrical transmission lines exceeding 115,000 volts (115 kV) are categorized as a “Special Utility” and may be authorized by the Board of Adjustment as a conditional use in all zoning districts.

The Growth Management Act requires counties to develop policies and development regulations to protect the functions and values of critical areas. These are adopted in ordinance and are typically referred to as CAOs. Critical areas identified by the Kittitas County in the study area include “Wetlands”, “Erosion Hazard Areas”, Floodplains and Floodways”, “Riparian Habitat”, “Geologically Hazardous Areas”, “Landslide Areas”, “Mine Hazard Areas”, “Seismic Hazard Areas”, and “Streams and Rivers”. Crossing of these areas in Kittitas County may require a Critical Areas Permit.

Grant County
The Grant County Comprehensive Plan (2006, amended 2010) documents the following goals and policies related to utilities and in particular, transmission lines:

Goal U-1: Necessary energy and communication facilities and services should be available to support current and future development

- Policy U-1.3: The County should encourage the location of necessary utility facilities within existing and planned transportation and utility corridors.

- Policy U-1.4: The County’s land use planning should be coordinated with the planning activities of electrical, telephone and cable providers to ensure that providers of public services and private utilities use the land use element of this plan when planning for future facilities.

Goal U-2: Negative impacts associated with the siting, development, and operation of utility services and facilities on adjacent properties, significant cultural resources, and the natural environment should be minimized

- Policy U-2.5: Where possible, the joint use of transportation ROWs and utility corridors should be encouraged, provided that such joint use is consistent with limitations as may be prescribed by applicable law and prudent utility practice

Goal U-5: Site utility facilities in conformance with the Land Use Element

- Policy U-5.1: Utility providers should avoid placement of facilities in areas designated as environmentally sensitive or critical areas unless no feasible alternative exists and only after a site assessment and mitigation plan has been approved under the provisions of Grant County's Resource Lands and Critical Areas Ordinance

- Policy U-5.2: Utility facilities should be permitted in all land use designations as necessary when and where utility franchises exist and if they are in compliance with the Comprehensive Plan.

"Decision Maker" is defined in Washington Administrative Code 197-11-730 and means the agency official or officials who make the agency's decision on a proposal.

Zoning in Grant County within the Project area is typically "Agriculture" and "Rural Remote". Grant County does not require a conditional use permit for the construction of a transmission line in any of its designations. However, because the Proponent is considered a private utility, a building permit would be required for line construction.

The GMA requires counties to develop policies and development regulations to protect the functions and values of critical areas. These are adopted in ordinance and are typically referred to as CAO. Critical areas identified by the Grant County in the study area include "Wetlands", "Frequently flooded areas", "Critical aquifer recharge areas", "Geologically hazardous areas", "Fish and wildlife habitat conservation areas", and "Cultural resource areas". Crossing of these areas in Grant County may require a Critical Areas Permit.

3.4.3.4 Grant County Public Utility District

As a condition of the FERC's re-licensing of the Priest Rapids Project in 2008, the Grant County PUD developed a Shoreline Management Plan to assist in day-to-day management activities as well as to ensure activities occurring on Priest Rapids Project lands are compliant with all applicable laws and regulations. The Priest Rapids Project is located on the Columbia River and consists of the Wanapum and Priest Rapids hydroelectric facilities. Both developments consist of reservoirs, power generation facilities, primary transmission lines, and other facilities and resources necessary to support and maintain Project operations. Final Shoreline Management Plan (SMP)(Grant County PUD 2010a) identifies three land use classifications: Project Facilities, Public Recreation Development, and Resources Management. The plan was approved by the Grant County PUD in March 2010 and submitted to FERC the same month for approval. The new SMP is subject to FERC approval before adoption by the Grant County PUD; however, the Grant County PUD has been and is managing Grant County PUD lands under the 2010 plan (Larimer 2011).

The new Final SMP (Grant County PUD 2010a) establishes three Land Use Classifications, and is the current plan in effect for Grant County PUD lands (Larimer 2011). Project Facilities, Public Recreation Development, and Resource Management are all located in the study area, and are described as follows in the plan:

- Project Facilities (PF) Classification allows for higher intensity uses that are primarily related to electrical power generation, transmission and associated Project-related facilities, as well as lands potential for such uses in the future, which may include education and/or interpretation facilities and public recreation facilities located within or immediately adjacent to Project facilities related to power. PF Classification controls public use of lands to protect public health and safety. Historical or cultural resources and wildlife restoration and/or enhancement activities may also occur in this classification. Non-Project uses such as roads, motorized vehicles and utilities require Grant County PUD approval. This is the only classification crossed by the proposed Project. This is the only classification the Project crosses on Grant County PUD owned lands.

- Public Recreation Development (PRD) Classification allows for recreation-oriented development, and includes exiting and proposed future recreation areas. Historical or cultural resources and wildlife restoration and/or enhancement activities may also occur in this classification. Primary uses consist of FERC-approved recreation infrastructure and activities identified in the Recreation Resources Management Plan (e.g., Burkett Lake Recreation Area). Other Non-project uses allowed within the PRD classification will be evaluated by Grant County PUD to determine consistency with the license and goals set forth in the SMP. Non-Project uses such as roads, motorized vehicles and utilities are allowed only within the context of an approved PRD Plan where a PRD Plan is required. The Project does not crossed PRD lands owned by Grant County PUD.

- Resources Management (RM) classification will be managed to preserve and enhance conservation and protection of fish, wildlife scenic, historic, archeological, and cultural resources. Protection of historical or cultural resources, as well as wildlife restoration and/or habitat enhancement activities are the primary functions of this classification. This classification will generally include those areas for which there are no specific FERC-approved Project facilities and/or public recreation improvements, identified within the license. Non-Project uses such as roads, motorized vehicles and utilities require Grant County PUD approval. The Project does not cross RM lands owned by Grant County PUD.

3.4.4 Route Segment or Zone-Specific Considerations

A general description of the analysis zones and route segments is located in Section 2.2 of this EIS. Table 2-1 presents a summary of the lengths of the route segments.

3.4.4.1 Zone 1 Overview

Zone 1 West includes land in the southwest part of JBLM YTC and unincorporated Yakima County from the Pomona Heights substation to east of Mieras Road. Land uses in the zone include low-density residential, military, rangeland, and irrigated cropland.

Route Segment 1a (Agency Preferred Alternative)
The predominant existing land use along this route is low-density residential. The segment crosses 2.3 miles of residential use areas. A total of 63 residences are within 500 feet of this route, and 97 are within 1,000 feet. This route segment crosses only private land. A total of 21 parcels owned by 14 private land owners are crossed. The route segment is located entirely in Yakima County. The route segment crosses and parallels Sage Trail Road near the Pomona Heights Substation on the south side, and crosses the road just east of the substation. The route segment parallels the north side of Sage Trail Road in a residential area, and crosses the Selah-Moxie irrigation canal, located at Milepost (MP) 0.4 and Pomona-Wanapum 230 kV transmission line at Shotgun Lane (MP 0.9). An existing Pacific Power electrical distribution line is located generally on the south side of Sage Trail Road, and 1.6 miles of this route segment would follow this line. No agricultural areas or PLSS sections containing CRP lands are crossed by Route Segment 1a. Refer to Table 3.4-5 for a summary of Land Use and Jurisdiction by Route Segment.

This route is located adjacent to land designated as “Remote Rural/Extremely Limited Development Potential Areas” in Yakima County’s “Plan 2015”. This land use category is applied to areas which are suitable for low development densities due to a combination of physical or location factors. This route would cross 26 privately-owned land parcels owned by 20 landowners and the Pacific Power Pomona-Wanapum 230 kV transmission line.

Route Segment 1b (Agency Preferred Alternative)
The existing land use along this route segment is dedicated to military operations (JBLM YTC). The route segment follows the JBLM YTC boundary for 12.5 miles along the fire break entirely on Army owned lands. The route segment is located entirely in Yakima County. The area is used for ground military training operations. There are two and four residences located within 500 feet and 1,000 feet, respectively, on adjacent private lands. The route crosses the BPA Ellensburg-Moxee 115 kV transmission line at MP 0.2.

The JBLM YTC training designations crossed by this route segment include TA-13, TA-11, and TA-10. Along and adjacent to the east-west section of the route segment on JBLM YTC, the land use is Zone 2 (Conservation), with digging and bivouacking activities limited. The land use along and adjacent to the north-south section of the route segment is Zone 3 (General Use).

No agricultural areas or PLSS sections containing CRP lands are crossed by Route Segment 1b.

Route Segment 1c
Route Segment 1c is similar to Route Segment 1b except Route Segment 1c is located outside of the JBLM YTC boundary. The predominant land use in the area is large lot residential, with this route segment crossing 11.4 miles of residential development. This route segment would cross 74 privately-owned parcels owned by 49 landowners and one state owned parcel. There are 17 and 28 residences located within 500 feet and 1,000 feet, respectively, of this route segment. The residential land development along this route is generally limited to roads and fences, with the majority of the parcels generally remaining in a natural or semi-natural condition and no ornamental landscaping, turf grass or other regular management activities occurring where the route segment crosses. The route segment is located entirely in Yakima County.

The route crosses the BPA Ellensburg-Moxee 115 kV transmission line at MP 0.3. The route segment parallels existing gravels roads (Sage Trail, John Street) on the west end of the route segment (MP 0.0-0.9), and crosses several minor gravels roads serving residences in the area (MP 0.4, 0.8, 4.1, 5.6). The route also crosses Coombs Road at MP 9.8, and Mieras Road at MP 10.2.

Agricultural land uses also occur along this route segment. Route Segment 1c crosses 0.2 mile of wheel line irrigated pasture (MP 9.8-10.0), 0.2 mile of hand-movable sprinkler irrigated apple orchards (MP 10.2-10.4) and 0.3 mile of dryland pasture (MP 9.6-9.8). The route segment also crosses and parallels Mieras Road for approximately 0.9 mile in a predominantly residential area between MP 10.2-11.3.

This route segment is located adjacent to land designated as “Remote Rural/Extremely Limited Development Potential Areas”, “Rural Self Sufficient” and “Agricultural Resource Area” in Yakima County’s “Plan 2015”.

For the north-south section of the route segment located adjacent to JBLM YTC lands the land use is designated as Zone 3 (General Use). The land use on JBLM YTC adjacent to the east-west section of the route segment is Zone 2 (Conservation-Sage Grouse Protection Area).

3.4.4.2 Zone 2 Overview

This zone includes an area south of the JBLM YTC boundary roughly to State Route 24 and extends east to the Columbia River.

Route Segment 2a (Agency Preferred Alternative)
The existing land use along this one mile long route segment is undeveloped rangeland. This route segment would cross five privately-owned land parcels owned by two owners, and is adjacent to a state-owned parcel that is leased for grazing. The route segment is located entirely in Yakima County.

Land on the west side of the route segment is designated in Yakima County's "Plan 2015" as "Remote Rural/Extremely Limited Development Potential Areas" and land on the east side is designated as "Agricultural Resource Area" (Yakima County 2007).

No agricultural areas or PLSS sections containing CRP lands are crossed by Route Segment 2a.

Route Segment 2b
The existing land use along Route Segment 2b is rangeland. This route segment would cross 23 privately-owned land parcels owned by seven landowners, and also crosses two parcels of BLM lands for a distance of 0.7 mile. All BLM lands along this segment are leased for grazing, and the route is located entirely in Yakima County. No linear features such as transmission, distribution lines are crossed or paralleled. No major roads are crossed or paralleled along this route. The route parallels JBLM YTC for eight miles along its southeastern boundary. This route segment crosses a two PLSS sections (T.12N, R.23E, Sections 8 and 9) that contain CRP lands on unknown parcels.

According to Yakima County's "Plan 2015", the land is designated as "Agricultural Resource Area" (Yakima County 2007). Where the line parallels the JBLM YTC boundary, the land use on JBLM YTC is Zone 3 (General Use).

Route Segment 2c (Agency Preferred Alternative)
The existing land use along Route Segment 2c is predominantly rangeland with some cultivated areas of row crops. Private land crossed totals 17.1 miles and state lands account for one mile, and the route is located entirely in Yakima County. This route segment would cross 44 privately-owned land parcels owned by eight landowners. Alfalfa hay, timothy, wheat, and wildland feed are crossed by this route segment. A total of 0.9 mile of irrigated cropland and 1.1 miles of dryland agriculture is crossed. The only method used for irrigation is center pivot, and a total of five pivots are crossed. Grazing leases on one mile of state land and irrigated agricultural state leased land totaling 0.1 mile is also crossed. However, the irrigated state lease land crossed is currently only irrigated on the south 0.5 of the section (refer to Appendix A: Agriculture and Irrigation-Page 2 of 5, Route 2c MP 4.6). One residence is located within 500 feet of this route segment, and two are within 1,000 feet. There is one agricultural processing building located at MP 11.0 (refer to Appendix A: Agriculture and Irrigation-Page 3 of 5) to would be affected by this route segment, just west of the Rattlesnake Substation (owned and operation by Benton Rural Electric).

Route segment 2c would parallel the BPA Midway-Moxee 115 kV and the PacifiCorp Union Gap-Midway 230 kV transmission line corridor on the south side for 8.6 miles, crossing the lines twice (MP 8.5 and MP 17.2).

According to Yakima County's "Plan 2015", the land is designated as "Agricultural Resource Area" (Yakima County 2007).

Route Segment 2d (Agency Preferred Alternative)
The existing land use along Route 2d is primarily rangeland, and the route segment crosses the Umtanum Ridge, paralleling the Yakima-Benton County border and crossing into Benton County, terminating on the south bank of the Columbia River at the old (abandoned) C, M, SP, & P railroad ROW and Priest Rapids Road extension. Grazing is the primary land use along this route. No agricultural areas or PLSS

sections containing CRP lands are crossed by Route Segment 2d. No linear features are present along this route. This route segment would cross six miles of privately-owned land on 13 parcels owned by three landowners and a contiguous section of BLM land totaling one mile. Most of the BLM land crossed contains grazing leases (0.8 mile, MP 1.0-1.5 and to 1.7-2.0). The route also crosses Cold Creek Road at MP 4.4. Cold Creek Road only accessible from JBLM YTC to the west, and is closed to public access from the east and SR 24.

According to Yakima County's "Plan 2015", the land is designated as "Agricultural Resource Area" (Yakima County 2007). According to Benton County's Land Use Plan, the land is designated as "Agricultural" (Benton County 2006). Where the route segment parallels the JBLM YTC boundary, the land use on JBLM YTC is Zone 3 (General Use).

3.4.4.3 Zone 3 Overview

Route Segment 3a (Agency Preferred Alternative)
The existing land use along Route Segment 3a is a utility corridor for overhead transmission lines owned by BPA, Grant County PUD and PacifiCorp on land owned by Reclamation. The route is located east of the Vantage Substation, and parallels four 230 kV transmission lines (Grant County PUD Priest Rapids-Vantage, BPA Vantage-Midway, PacifiCorp Vantage-Walla Walla, and BPA Columbia-Vantage) for 0.1 mile into the substation.

According to the Grant County Comprehensive Plan Map, the land use designation is "Rural Remote". The primary land uses include, but are not limited to farming, mineral extraction, open space and residential (maximum density of one dwelling unit per 20 acres).

No agricultural areas or PLSS sections containing CRP lands are crossed by Route Segment 3a.

Route Segment 3b
The existing land use along Route Segment 3b is a mix of military, residential, farming (orchards: Auvil Fruit Company), and the Priest Rapids Project. This route segment is located almost entirely within the abandoned C, M, SP, & P railroad ROW, except on the north end where the route crosses the BLM and JBLM YTC land and the Columbia River. A portion of this corridor is used as the John Wayne Pioneer Trail (Special management areas are described in greater detail in Section 3.6, and recreation areas are detailed in Section 3.5). BLM land is crossed for 0.4 mile of this route, JBLM YTC lands are crossed for 0.8 mile, Reclamation lands are crossed for 1.4 miles, and the route is located within the Kittitas County Huntzinger Road ROW for 1.1 miles. The BLM land contains oil and gas leases. The private lands and the railroad ROW are crossed for 18.0 miles along this route. This route segment would cross 55 privately-owned land parcels owned by three landowners. Route Segment 3b is located adjacent to hand-movable sprinkler irrigated apple orchards in the railroad ROW.

In Kittitas County, a large orchard is located between JBLM YTC and the Columbia River along Huntzinger Road. The orchard includes administrative offices and some housing facilities for Auvil Fruit Company workers. Other residential areas along this route segment include nine single-family detached houses near the south end of the orchard on the west side of Huntzinger Road along Auvil Road and approximately 14 single-family detached houses on the east side of the route segment next to the Priest Rapids Dam in Yakima County. A total of 21 residences are located within 500 feet and 31 are within 1,000 feet of the route segment. The route parallels the existing BPA/PacifiCorp utility corridor across the Columbia River south of the Wanapum Dam. This route segment is located primarily in Yakima and Kittitas Counties. Approximately two miles of this route is located in Grant county (south of Wanapum Dam on the east side of the Columbia River), and a small section (0.1 mile) is located in Benton County.

According to the Yakima County "Plan 2015", Comprehensive Plan, the land along the route segment south of Priest Rapids Dam is designated as "Agricultural Resource Area" (Yakima County 2007). The Plan does not designate future land uses north of the dam as there is only a sliver of land associated with the former railroad where this route segment would be located between JBLM YTC and the Columbia River north to the Kittitas County line that provides limited development opportunity.

According to the Kittitas County Comprehensive Plan 2010, the Auvil orchard is designated as "Commercial Agriculture". Land within this designation is not characterized by urban growth, is primarily devoted to agriculture and has long-term significance for agriculture. Other lands along the route segment are designated as "Rural Lands". Land uses reflect traditional rural lifestyles, landscapes and economies.

The Grant County PUD "Shoreline Management Plan" also designates land uses on the east and northeast sides of the route segment (Grant County PUD 2010a). Approximately one mile upstream and downstream of the Priest Rapids Dam east of the route segment, the land use is designated as "Project Facilities" and are managed for the electrical power generation, transmission and associated facilities with the Priest Rapids Project, as well as for lands with the potential for such uses in the future. North of the lands designated as "Project Facilities", the land east of the route segment is designated as "Resources Management" and are managed to preserve and enhance conservation and protection of fish, wildlife, scenic, historic archaeological and cultural resources. The Plan classifies land around the Vantage substation and the Wanapum Dam and the PUD's Priest Rapids-Vantage 230 kV transmission line as "Project Facilities". The Wanapum Dam, a Grant County PUD operated hydroelectric facility, is located approximately 0.8 mile north of Route Segment 3b at the river crossing.

Route Segment 3c (Agency Preferred Alternative)
The existing land uses along this route segment include rangeland, irrigated cropland (orchards, vineyards, and row crops), high voltage transmission lines, the Priest Rapids Project and special management areas (the BLM's Saddle Mountains MA and McCoy Canyon Area of Critical Environmental Concern, the WDFW Lower Crab Creek Wildlife Area-a unit of the Columbia Basin Wildlife Area, Burkett Lake Recreation Area Grant County PUD). The Columbia River is crossed west of the Hanford Reach National Monument at MP 2.3 to 2.6. Private land is crossed for 15.6 miles, BLM lands for 4.4 miles, and Reclamation lands for 5.2 miles. Dispersed agriculturally related residential areas are crossed along the Wahluke Slope and Beverly area.

The line crosses recreational use areas along the Milwaukee Corridor and Nunnally Lake area. The western portion of BLM's Saddle Mountains MA is used for recreation, principally for OHV riding and rockhounding/petrified wood collection. Some hang-gliding and paragliding use also takes place, but the primary launch point is on private land. Special management areas are described in greater detail in Section 3.6, and recreation areas are detailed in Section 3.5. Nine communication towers are located near the summit of the Saddle Mountains east of the route segment. This route segment would cross 79 privately-owned land parcels owned by 27 landowners. A total of 15 residences are located within 1000 feet of this route segment, fourteen of which are within 500 feet. Grazing allotments are also crossed for a total of 4.2 miles on BLM lands along this.

This route segment parallels the BPA Hanford-Vantage #1 500 kV transmission line in BLM designated Utility Corridor for four miles and on other non-BLM lands for 2.5 miles, crossing the line in three locations: MP 14.6, 22.2 and 25.1. The BPA Vantage-Midway 230 kV and BPA Schultz-Wautoma 500 kV transmission lines are also crossed by this route segment at MP 5.1.

Along the section of the route segment parallel to Road N SW, between State Route 243 and the foothills south of the Saddle Mountains, the adjacent land use is irrigated cropland consisting of numerous center pivot irrigation systems and a system of concrete-lined irrigation canals and ditches, including one that parallels Road N SW. There is one livestock (cattle) feeding operation located west of the route segment midway between Road 24 SW and a Reclamation irrigation canal, the Wahluke Branch Canal. The route crosses the Nunnally Lake drainage canal located northeast of Burkett Lake (MP 21.7). This route would cross SR 243 at MP 3.9, parallel Road N from MP 5.3 to 11.3, parallel Road 24 SW between MP 11.3 and 12.3, parallel O Road between MP 12.3 and 13.4. The route crosses Lower Crab Creek Road at MP 21.2. This route segment is also in proximity to the aforementioned paved private airstrip located north of Nunnally Lake that is part of the Lower Crab Creek Unit of the Columbia Basin Wildlife Area.

The concentration of irrigated cropland and irrigation infrastructure (e.g., center pivots, ditches, siphons) along and adjacent to Roads N SW and O SW are concerns for the operation of a transmission line as well as farming operations (cultivation, harvesting, pest management). Careful siting of the transmission line structures in cooperation with land owners are required to manage any conflicts with agricultural operations. This is covered in more detail in Chapter 4. A total of 2.7 miles of irrigated agricultural land is crossed by this route segment. The crop types crossed include wine grapes (1.5 miles), wheat (0.5 mile), cherries (0.3 mile), green pea (0.2 mile), potato (0.2 mils), and small areas of alfalfa hay, blueberry, field corn, and timothy totaling less than 0.1 mile. Hand-moveable sprinkler irrigation is the predominant method used along the route segment, accounting for 1.2 miles crossed. Also, circle (center pivot) irrigation is crossed along 0.9 mile and nine pivots. Smaller areas of drip and other irrigation are also used along the route segment. Appendix a: Maps 9a through 9e shows the crop types and irrigation infrastructure in the Wahluke Slope area of this route segment. Also refer to Table 3.4-5 for a summary of land uses.

The Grant County PUD "Shoreline Management Plan" also designates land uses adjacent to Lower Crab Creek. Lands classified as "Resources Management and "Public Recreation Development", which are managed for recreation-oriented development are located adjacent to Lower Crab Creek (Grant County PUD 2010a). The Burkett Lake Recreation Area (see Section 3.5 - Recreation) is located west and south of the route segment north of Lower Crab Creek. The Plan classifies land around the Vantage substation and the Wanapum Dam and the PUD's Priest Rapids-Vantage 230 kV transmission line as "Project Facilities".

TABLE 3.4-5 LAND USE AND JURISDICTION SUMMARY BY ROUTE SEGMENT

	DISTANCE CROSSED BY ROUTE (MILES)									
	Zone 1			Zone 2				Zone 3		
	1a	1b	1c	2a	2b	2c	2d	3a	3b	3c
Land Use										
Agriculture (Total)	**-**	**-**	**0.7**	**-**	**-**	**2.0**	**-**	**-**	**-**	**2.7**
Alfalfa Hay	-	-	-	-	-	0.4	-	-	-	<0.1
Apple	-	-	0.2	-	-	-	-	-	-	-
Blueberry	-	-	-	-	-	-	-	-	-	<0.1
Cherry	-	-	-	-	-	-	-	-	-	0.3
Corn, Field	-	-	-	-	-	-	-	-	-	<0.1
Fallow	-	-	<0.1	-	-	-	-	-	-	-
Grape, Wine	-	-	-	-	-	-	-	-	-	1.5
Pasture	-	-	0.5	-	-	-	-	-	-	-
Pea, Green	-	-	-	-	-	-	-	-	-	0.2
Potato	-	-	-	-	-	-	-	-	-	0.2
Timothy	-	-	-	-	-	0.5	-	-	-	<0.1
Wheat	-	-	-	-	-	0.1	-	-	-	0.5
Wheat, Fallow	-	-	-	-	-	0.5	-	-	-	-
Wildlife Feed	-	-	-	-	-	0.5	-	-	-	-
Irrigation Land (Total)	**-**	**-**	**0.4**	**-**	**0.0**	**0.9**	**-**	**-**	**-**	**2.7**

	DISTANCE CROSSED BY ROUTE (MILES)									
	Zone 1			Zone 2				Zone 3		
Center Pivot (# Crossed)	-	-	-	-	-	0.9 (5)	-	-	-	0.9 (9)
Drip	-	-	-	-	-	-	-	-	-	<0.1
Hand-moveable Sprinkler	-	-	0.2	-	-	-	-	-	-	1.2
Unknown	-	-	-	-	-	-	-	-	-	0.6
Wheel Line	-	-	0.2	-	-	-	-	-	-	-
Dryland Agriculture	-	-	0.3	-	-	1.1	-	-	-	-
Residential Area Crossing	2.3	-	11.4	-	-	-	-	-	-	-
Residences										
within 500 feet	63	2	17	-	-	1	-	-	21	14
within 1000 feet	97	4	28	-	-	2	-	-	31	15
Recreation/Conservation	-	-	-	-	-	-	-	-	-	0.1
Military	-	12.5	-	-	-	-	-	-	10.0	-
Undeveloped/Vacant	-	-	1.5	1.0	16.4	14.4	7.0	0.1	7.2	15.5
Unincorporated Communities	-	-	-	-	-	-	-	-	0.3	-
Open Water	-	-	-	-	-	-	-	-	2.2	0.4
Leases										
Oil & Gas	-	-	-	-	-	-	-	-	0.5	0.3
Grazing	-	-	-	-	0.7	1.0	0.8	-	-	4.2
Irrigated Agriculture (State Lands)	-	-	-	-	-	0.1	-	-	-	-
Other										
Farmland of Statewide Importance	0.1	1.5	-	0.2	0.4	2.8	0.1	-	4.5	3.4
Unique Farmland	1.8	0.1	0.1	0.4	3.4	6.5	2.3	-	0.6	8.1
Prime Farmland if Irrigated	0.1	6.0	-	-	0.5	1.4	0.1	-	0.3	1.1
Ownership										
BLM	-	-	-	-	0.7	-	1.0	-	0.4	4.4
JBLMYTC	-	12.5	-	-	-	-	-	-	0.8	-
Reclamation	0.3	-	-	-	-	-	-	-	1.4	5.2
Total Federal Land	*0.3*	*12.5*	-	-	*0.7*	-	*1.0*	-	*2.7*	*9.6*
State Land	-	-	1.0	-	-	1.0	-	-	-	-
Kittitas Co. Road ROW	-	-	-	-	-	-	-	-	1.1	0
Private Land	2.0	0.1	11.9	1.0	15.7	17.1	6.0	0.1	17.5	15.6
County										
Benton County	-	-	-	-	-	-	0.7	-	0.1	2.5
Grant County	-	-	-	-	-	-	-	0.1	2.0	22.7
Kittitas County	-	-	-	-	-	-	-	-	9.5	-
Yakima County	2.2	12.5	12.9	1.0	16.3	18.1	6.4	-	10.1	-
Parcels and Landowners										
Number of Parcels Crossed	21	3	74	5	23	44	13	1	55	79
Number of Private Landowners	14	2	49	2	7	8	3	0	3	27
Miles of PacifiCorp Existing Distribution Rights	1.6	-	-	-	-	-	-	-	-	-
Miles Paralleling Existing Transmission	-	-	-	-	-	8.6	-	0.1	6.5	-

3.5 RECREATION

3.5.1 Data Sources

This section describes existing recreation resources in the Project area. Dedicated and dispersed recreational activities and lands used or dedicated for recreational activities were inventoried within one mile of the Project centerlines. Dedicated recreational activities refer to site specific areas where physical improvements such as structures, equipment, trails or other infrastructure has been installed or constructed to support specific activities such as sporting events, camping, off-highway vehicle (OHV) riding, and mountain biking. Dispersed recreational activities are not geographically specific, and may include activities such as hunting, snow-shoeing, wildlife viewing, and other activities. Passive and active recreation activities occur throughout the Project area. Passive recreation includes those activities that do not require intensive facility development, organized sports or motorized vehicles such as wildlife observation, photography, hiking, horse-back hiding, and biking. Active recreation includes motorcycling, OHV use, organized sporting activities, and other activities that require facility development and maintenance.

Data sources came from various readily available secondary sources and field reviews conducted between May 9 and 12 of 2011. Data layers were obtained from federal and state agencies; input from agency staff; county and federal land use and recreation planning documents; communications with various agency staff; Public Lands Information System; geographic information system (GIS) database; county Chamber of Commerce websites; and other online data. Existing recreational resources in the Project area were verified in the field.

Scoping comments included concern for the Milwaukee Road corridor recreation impacts, Grant County Public Utility District (PUD) Federal Energy Regulatory Commission (FERC) license measures regarding the management for recreation values, visual impacts on tourism, disruption of recreational activities along the old Chicago-Milwaukee-St. Paul, and Pacific (C, M, SP, & P) Railroad corridor, potential duck and geese hunting and fishing impacts along the railroad corridor, and potential impacts on Beverly Sand Dune recreational opportunities. These comments and issues were considered during data collection analysis of the Project area.

3.5.2 Current Conditions and Trends, Regional Overview

3.5.2.1 Federally Administered Recreation Areas

Columbia National Wildlife Refuge
A portion of the Columbia National Wildlife Refuge is located in the Project area in one contiguous parcel along Lower Crab Creek and the northern slope of the Saddle Mountains (see Appendix A-Jurisdiction, Recreation and Special Management Areas Map). The refuge is managed by the U.S. Fish and Wildlife Service (USFWS; see Section 3.6-Special Management Areas). Recreational opportunities within the refuge are limited to areas well to the east of the Project area (e.g., Drumheller area, Potholes Reservoir). No public access is provided to the refuge in the Project area.

Hanford Reach National Monument
The Hanford Reach National Monument (HRNM) is located in the Project area along the Columbia River. HRNM lands are owned and administered by either the U.S. Department of Energy (DOE) or USFWS. Lands administered by the USFWS include the previously designated Saddle Mountains National Wildlife Refuge, which existed prior to, and was incorporated into, the HRNM when it was established on June 9, 2000. See Section 3.6 for a full description of the HRNM.

The Columbia River Corridor, Wahluke, and Rattlesnake Administrative Units of the HRNM are in the Project area as identified in the Final Hanford Reach National Monument Comprehensive Conservation Plan and Environmental Impact Statement (2008). The HRNM generally supports dispersed and dedicated recreational activities such as boating, rafting, hunting, hiking, wildlife viewing, and environmental education. Although the river (Columbia River Corridor Administrative Unit) is open and accessible to the public, the Columbia River Corridor and Rattlesnake Administrative units (adjacent to and south of the river, DOE owned lands) are closed to public use with the exception of the area north and west of Vernita Bridge. The Wahluke Administrative Unit, located on lands owned by the USFWS, is open. Access is controlled, with "many/most" public uses allowed; hunting is not allowed.

Yakima Training Center
The United States Army's Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) is dedicated for military maneuver training and weapons testing, and also serves as a nature preserve and recreation area. Portions of the JBLM YTC are open for public use for a variety of non-motorized activities. Access to the JBLM YTC is limited and controlled at the operations center. JBLM YTC recreational uses include activities such as hunting, hiking and horseback riding in non-restricted areas at times when scheduled training exercises are not being conducted and when the activities are approved by the JBLM YTC commander. A portion of John Wayne Trail is located within, owned, and managed by the JBLM YTC (see below). The trail is used for hiking, trail rides, bicycling, and horseback riding (Army 2010).

Saddle Mountains Management Area
The BLM administers the Saddle Mountains Management Area (MA), which contains all BLM-managed lands that are within the Project area in Grant County. Additional scattered BLM administered areas are located in Kittitas and Yakima Counties. The primary activities occurring in the Saddle Mountains MA are hiking, horseback riding, hunting, mountain biking, hang gliding, paragliding, petrified wood collecting, and OHV riding on the west end of the Saddle Mountains Management Area. For a major portion of the Saddle Mountains MA, OHV use is restricted to designated roads and trails. Approximately 4,300 acres of public land in the western portion of the Saddle Mountains MA is designated as open to OHV use. Limited use restricts vehicle use to designated trails (see Appendix A: Jurisdiction, Recreation and Special Management Areas Map).

Recreational use data has been collected in the Spokane District since the middle 1980s, and is stored in the Recreation Management Information System (RMIS). Visitation estimates were compiled as part of the Eastern Washington and San Juan Resource Management Plan management situation analysis (BLM 2011). Visits and visitor days were estimated for the Saddle Mountains MA. Planning area total recreation visits/visitor days were estimated for 2001 through 2009. A visit represents one person's trip or visit, and a visitor day represents one person engaging in an activity for any part of the day. In both 2008 and 2009, the latest visitation estimate dates, there were 3,000 visits and 3,500 visitor days in the Saddle Mountains MA (for all recreation sites and dispersed users). Compared to the nearby Yakima River Canyon MA, recreation sites visits/visitor days are relatively low in the Saddle Mountains.

3.5.2.2 State Administered Recreation Areas

Beverly Sand Dunes OHV Park
Managed by the Washington Department of Natural Resources (WDNR), the 300 acre Beverly Sand Dunes OHV Park is located in the northern portion of the Project area in Grant County between the northern slope of the Saddle Mountains and Lower Crab Creek, approximately one mile east of Mattawa. Located on state owned lands, the area was developed as a cooperative project between the WDNR and the Washington Department of Fish and Wildlife (WDFW), and is maintained with off-road vehicle license funds. The site contains primitive campsites, toilets, picnic tables and fire pits, also.

Buckshot Boat Launch
Buckshot Boat Launch is located on the east side of the Columbia River southwest of Mattawa. The site is accessed from Road 26 SW, and includes a gravel parking lot. No restrooms are available, but camping is allowed. Currently, there are no plans for expansion or improvements at this facility.

Columbia Basin Wildlife Area
The Columbia Basin Wildlife Area is managed by the WDFW. Two administrative units are located in the Project area: The Lower Crab Creek Unit and the Priest Rapids Unit (see Appendix A: Jurisdiction, Recreation and Special Management Areas Map).

Lower Crab Creek Unit
The Lower Crab Creek Unit of the Columbia Basin Wildlife Area provides trout fishing, camping, hunting, wildlife viewing and non-motorized boating activities in and around Nunnally Lake and Lenice Lake. The area is accessed by a parking lot located east of Beverly along Crab Creek Road, and includes restroom (outhouse) facilities.

Columbia Basin Wildlife Area-Priest Lake Unit
The Priest Lake Unit of the Columbia Basin Wildlife Area provides access to the Columbia River. The unit includes Goose Island, located just north of the Priest Rapids Dam. There are no developed recreation sites within this unit.

John Wayne Pioneer Trail-Iron Horse State Park/Milwaukee Road Corridor
The John Wayne Pioneer Trail, also known as the Milwaukee Road Corridor in the Project area, includes 100 miles of trail and is part of the Iron Horse State Park. The Washington State Parks and Recreation Commission owns an abandoned railroad (referred to by the state as the "Milwaukee Road Corridor", the old C, M, SP & P Railroad) through the Lower Crab Creek area, Beverly, and across the Columbia River the JBLM YTC. Twenty-two miles of the trail are located within, owned and managed by JBLM YTC (Army 2010). The eastern-most portion of the trail crosses the Project area on the north side. The trail follows the C, M, SP, & P Railroad corridor thorough Beverly and crosses the river along the Beverly Trestle Railroad Bridge (a National Register of Historic Places site, see Section 3.11-Cultural Resources), extending into the JBLM YTC just west of Wanapum Dam. Hikers, bicyclists, equestrians, waggoners, cross-country skiers, snowshoers and dog-sledders all use the trail. A parking area, "Army East Trailhead", is located south of the Wanapum Dam on the west side of the river. Access to the John Wayne Trail/Milwaukee Road Corridor is provided by permit only (pursuant to WAC 332-52-500) on all portions of the trail other than those portions on the JBLM YTC. Permits are obtained through the WDNR. On the JBLM YTC, permits are required for camping and after dark use, and can be obtained from the JBLM YTC Operations Center. No hunting or motorized use is allowed in the corridor. The corridor is open for use year-round.

3.5.2.3 County Administered Recreation Areas

Yakima County
There are no Yakima County administered recreation sites in the Project area. A northern extension of the Yakima River Greenway is proposed along the west bank of the river in the Project area (Yakima County 2008).

Benton County
There are no Benton County administered recreation sites in the Project area.

Kittitas County
There are no Kittitas County administered recreation sites in the Project area.

Grant County
Grant County does not own or administer any parks or recreation sites in the study area. Parks and recreation sites are owned and administered by Grant County PUD who manages parks and recreation facilities under the Shoreline Management Plan (SMP; Grant County PUD 2010a) and the Recreation Resource Management Plan (RMP). The Recreation RMP identifies recreation enhancement projects to be implemented by Grant County PUD that will ensure improved public recreation opportunities while also meeting FERC license requirements and project operations (Grant County PUD 2010b).

Burkett Lake/Crab Creek Corridor Recreation Area (Grant County PUD)
The Burkett Lake/Crab Creek Corridor Recreation Area is located on Crab Creek Road approximately 0.5 mile east of Beverly. Currently, a day use area with picnic tables and an informational kiosk is located on the northwest side of the park, and a gated access road which allows for lake access is located on the east side. Existing uses of the area also include dispersed, non-motorized activities such as hiking, hunting, fishing, scenery viewing, and wildlife/botanical watching. Developed features on site also include:

- Bonneville Power 500 kV transmission lines and lattice structures,
- Water pump structure,
- Concrete hand-launch boat ramp,
- Access bridge, and
- Non-operational irrigation pump.

Grant County PUD has plans for facility improvements at the existing day use site, as well as on the lake's south side. The future development would expand upon the existing east side access with a 2000 foot long road, and would also include picnic tables, an interpretive kiosk, accessible fishing piers, vault toilets, trash receptacles, parking, and two miles of interpretive trails. Scheduled for completion by the end of 2014, the proposed development will take place on three parcels that includes U.S. Bureau of Reclamation (Reclamation) and Grant County PUD lands, and will include wildlife enhancement measures and associated propagation gardens and utility sheds.

Priest Rapids Lake (Grant County PUD)
Priest Rapids Lake is typically used for fishing, boating and sightseeing. The lake is part of the Priest Rapids Hydroelectric Project, administered by the Grant County PUD No. 2 under a license agreement with FERC. Access to the lake in and around the study area is from the Desert Aire Boat Launch. Other nearby launches on the lake include the Huntzinger Boat Launch (Grant County PUD), located on the south side of the Wanapum Dam, and the Lower Wanapum Dam Boat Launch and Picnic Area (Grant County PUD). The Huntzinger Boat Launch is in the process of being improved pending land lease negotiations. The Lower Wanapum Dam Boat Launch is located just west of the Wanapum Heritage Center. Future plans include additional signage and the installation of a toilet in the picnic area, extension of the float, and improvements to the parking area.

All FERC licensees are required to submit a recreation report on a six year cycle. Approximately 17.1 percent of the shoreline of the Priest Rapids Reservoir Development Project is accessible to the general public by land travel without trespass. There were a total of 7,782 total annual daytime recreation day visits to the Priest Rapids Project and 1,428 total annual nighttime recreation day visits in 2008. Peak weekend day visits totaled 734 and total nighttime peak weekend visits totaled 127 (Grant County PUD 2008a).

Priest Rapids Recreational Trail (Grant County PUD)
Priest Rapids Recreational Trail is a Grant County PUD administered undeveloped trail located along the east side of Priest Rapids Lake adjacent to the Desert Aire community. Currently, a day use access site is

located at the south end of Road U SW and the Desert Aire Dock is located south of the community. The trail generally follows the shoreline between Desert Aire Dock and the Grant County PUD Day Use Area. Future plans for the site include a new parking lot located on the south end of U SW Road north of Desert Aire.

Wanapum Heritage Center/Picnic Area (Grant County PUD)
The Wanapum Heritage Center presents, maintains and continues the Wanapum History and way of life. Visitors to the museum can view numerous displays of Wanapum historical artifacts or watch videos of the Wanapum history and the Columbia River. The Heritage Center is located next to Wanapum Dam on the Columbia River west of SR 243. The Wanapum Heritage Center's activities are focused towards interior displays and activities, but there an outdoor picnic area located just south of the facility containing picnic tables and parking. Grant County PUD has plans for signage and toilet expansion of the site. The facility is open throughout the year.

Wanapum Dam Overlook (Grant County PUD)
Wanapum Dam Overlook is located just east of SR 243 northeast of Wanapum Dam. The overlook is currently unmarked from SR 243, and provides views to Wanapum Lake and the Columbia River corridor. Current expansion plans include improvements to the parking lot and access road, and the construction of a picnic area and toilet.

Wanapum Lake (Grant County PUD)
Wanapum Lake is also part of the Priest Rapids Hydroelectric Project, administered by the Grant County PUD No. 2 under a license agreement with FERC. Access to the lake near the study area is from the Upper Wanapum Dam Boat Launch and Getty's Cove Boat launch located on the south end of the lake off of Huntzinger Road south of Wanapum State Park. As with Priest Rapids Lake, recreational activities include fishing, boating and sightseeing. The Upper Wanapum Dam Boat Launch (Grant County PUD) is located on the east side of the lake west of SR 243. Future plans include the installation of an Americans with Disabilities Act (ADA) (accessible) float at the site, surface improvements to the parking area, and the construction of toilet facilities.

Approximately 12.5 percent of the shoreline of the Wanapum Dam Development Project is accessible to the general public by land travel without trespass. There were a total of 31,140 total annual daytime recreation day visits to the Wanapum Dam Development Project and 32,028 total annual nighttime recreation day visits in 2008. Peak weekend day visits totaled 3,860 and total nighttime peak weekend visits totaled 974 (Grant County PUD 2008b).

3.5.2.4 Municipal Administered Recreation Areas

There are no municipal administered recreation areas located within one mile of the Project alternative route segments.

3.5.2.5 Private Recreation Areas and Activities and Other Areas

Hunting
Big game, small game, waterfowl, upland bird and other game species are hunted throughout the Project area. Hunting occurs on private lands, as well as in public areas as described above. Chukar habitat is actively managed in the Saddle Mountains area. Big game hunting occurs in the three WDFW Game Management Units (GMUs) that are located in the study area. Rattlesnake Hills (GMU 372) includes all of Yakima and Benton Counties exclusive of JBLM YTC in the study area. Alkali (GMU 371) includes all of JBLM YTC, and Wahluke (GMU 278) includes all of Grant County in the study area. Total combined 2010 General and Special Permit Harvests for elk and deer in the Project area GMUs are shown

in Table 3.5-1 below. Small game harvests are tracked by counties in Washington. Small game harvests for Yakima, Benton Kittitas, and Grant Counties are shown in Table 3.5-2.

Columbia River

Below the Priest Rapids Dam, recreation on the Columbia River is dispersed, and typically dedicated to boating, fishing, and sightseeing activities. Rafting the free-flowing portion of the river (below Priest Rapids Dam through the HRNM) is also a popular activity. In the Project area, the closest access to the river is at the Vernita Boat Launch/Fishing Access Site located just upstream from the Vernita Bridge and outside of the Project area (see Section 3.8-Visual Resources).

The Hanford Reach is the only stretch of the Columbia River in the United States that is not impounded by a dam. The Hanford Reach of the Columbia River and public lands within 0.25-mile was recommended for inclusion in the National Wild and Scenic Rivers system as a "Recreational River" as a result of a study conducted by the National Park Service (NPS 1994; also see Section 3.6).

TABLE 3.5-1 COMBINED BIG GAME GENERAL AND SPECIAL PERMIT 2010 HARVEST IN GMU CROSSED BY THE PROJECT

SPECIES	GAME MANAGEMENT UNIT (GMU) NAME & NUMBER (ROUTES)		
	Alkali-371 (1b, 3b)	*Rattlesnake Hills-372 (1a, 1c, 2a, 2b, 2c, 2d)*	*Wahlike-278 (3a, 3b, 3c)*
Elk	25	22	2
Deer	3	40	56

Source – WDFW 2011a

TABLE 3.5-2 SMALL GAME HARVESTS AND HUNTERS BY COUNTY (2010)

	HARVEST NUMBER (# OF HUNTERS) PER COUNTY			
Species	***Yakima***	***Benton***	***Grant***	***Kittitas***
Canada Goose	3,268 (814)	3,480 (850)	12,030 (2,733)	486 (161)
Chukar Partridge	1,283 (671)	243 (135)	318 (426)	1,423 (514)
Cottontail Rabbit	1,916 (471)	255 (55)	971 (215)	391 (82)
Duck	30,824 (1,703)	23,902 (1,23)	51,569 (4,635)	4,568 (424)
Forest Grouse	3,601 (2,809)	0 (0)	0 (0)	4,947 (3,515)
Gray Partridge	451 (246)	100 (73)	344 (264)	470 (171)
Mourning Dove	12,335 (875)	3,325 (274)	18,287 (1,343)	925 (85)
Pheasant	7,147 (2,630)	1,655 (1,075)	10,343 (4,295)	1,190 (572)
Quail	24,882 (2,411)	4,071 (605)	14,024 (2,241)	3,082 (579)
Snipe	147 (74)	10 (10)	101 (46)	47 (19)
Snowshoe Hare	81 (154)	0 (0)	0 (0)	35 (81)

Source – WDFW 2011b

Wineries

Wineries and wine tasting generates tourism to the region, especially in Grant County. Fox Estate Winery and Ginkgo Forest Winery both are located near Mattawa in Grant County more than three miles from the Project.

Saddle Mountain Private Hang Gliding Launch Site

A privately owned hang gliding and paragliding launch site is located in the Saddle Mountains. The site is owned by the Maughan family, and yearly permits are negotiated between the owners and the Cloudbase County Club (CBCC) which allows any United States Hang Gliding and Paragliding Association member to access the property to fly. Hang gliders launch from the area northeast of the existing communication towers, and land in the Beverly Sand Dunes OHV Park (see above; Maughan 2011; CBCC 2011).

3.5.3 Current Management Considerations

The USFWS/Columbia National Wildlife Refuge (NWR) is currently developing a "Comprehensive Conservation Plan" to guide the refuge for the next 15 years and beyond. The degree of recreational use of the refuge is being considered under the plan alternatives (USFWS 2011).

The HRNM/Saddle Mountains NWR is managed for recreational use under the Final Comprehensive Conservation Plan and Environmental Impact Statement (USFWS 2008). The plans recreational focus is for the development of recreational facilities along highways and in perimeter areas of the monument. However, the plan states that fishing (Columbia River) accounts for 67 percent of the total annual visitor days. Recreational activities associated with the Monument in the study area are limited to Columbia River wildlife observation, fishing and boating activities.

BLM manages the Saddle Mountains MA under the current Spokane District RMP (1985) and Record of Decision (ROD; BLM 1987) and the 1992 RMP (BLM 1992) Amendment and ROD, and the Recreation Management/Implementation Plan and Environmental Assessment for the Saddle Mountains Management Area (BLM 1997). As part of these plans, OHV events in the open area are limited, and the acquisition of property or easements to enhance trail use and access to petrified wood collecting sites is emphasized. The BLM has not identified any special recreation management areas (SRMAs) or extensive recreation management areas (ERMAs) under the current Spokane District 1985/1987 RMP and 1992 RMP Amendment/ROD. The BLM is currently revising the current Spokane District RMP. The draft Eastern Washington and San Juan RMP is not proposing any "special recreation sites" for the Saddle Mountains MA, but will contain alternatives for recreation management within the Saddle Mountains MA.

The Columbia Basin State Wildlife Area, which includes the Lower Crab Creek and Priest Rapids Units in the Project area, is managed under the 2006 management plan (WDFW 2006). Recreation resources are considered under the plan as an Agency Objective. The objective is related to biological resource management "to provide sustainable fish and wildlife related recreational and commercial opportunities compatible with maintaining healthy fish and wildlife populations and habitats".

Yakima County has developed a trails plan. The 2008, Yakima County Trails Plan (Yakima County 2008) focuses on unincorporated areas of the county, and addresses current activities, trends, and opportunities for trail expansion. Relevant programs policies and regulations were evaluated and recommendations made with regard to recreation facility types, service levels, design guidelines, trail standards safety, education and enforcement. Transportation linkage opportunities with consideration of bicycle and pedestrian friendliness and recognition of off-street travel corridor benefits were considered. Plan implementation strategies were developed addressing capital improvement, right-of-way (ROW) acquisition, development, maintenances and administration. Goals, policies and statements identified in the plan address the trail system establishment, design standards, public safety, alternative transportation, regional development, and adjacent ownership.

The Yakima County Comprehensive Plan (Yakima County 2007) identifies goals, objectives, and policies to guide resource protection and development within the county. The Parks and Open Space Element serves two purposes. The first is to determine the type and level of park and recreational services the county should provide. The second purpose is to clarify the broader functions and benefits of the counties open spaces. The goals, objectives, and policies pertaining to parks and open space consider are not relevant to the Project.

Open space and recreation resources are also covered in the Land Use Element and Rural Lands Sub-Element of the Grant County Comprehensive Plan (Grant County 2006). The following goals and policies pertinent to the Project identified in the plan includes:

Goal LU-5: The County should conserve or enhance important natural, cultural, and scenic resources.

- Policy LU-5.1: Open space land use designations should:
  - Enhance recreational opportunities and public access to open spaces.

Goal RU-1: Rural areas should take into consideration both human uses and the natural environment. Encourage rural development that maintains the rural character of the land and protects the land and water environments required by outdoor recreation, and other open spaces.

- Policy RU-1.1: Land uses in rural areas that are related to tourism, outdoor recreation, and other open space activities shall be preferred.

Goal NS-9: The County should recognize and protect the functions and values of the shoreline environments of statewide and local significance. For shorelines of state-wide significance, protection and management priorities are to:

Increase recreational opportunities for the public in shoreline areas. (Lower Crab Creek and the east/north side of the Columbia River in the study area; see Section 3.4 - Land Use).

Grant County PUD recreational lands are currently managed under the new Final SMP (2010). Grant County PUD manages the lands and waters of the Priest Rapids Project (Priest Rapids Dam, Wanapum Dam, and their associated reservoirs and transmission lines). A new SMP, submitted to FERC for approval on 3/2/2010, is subject to FERC approval before adoption by Grant County PUD, although Grant County PUD manages its lands under in accordance with this plan (see Section 3.4 - Land Use). One of the purposes of the plan is to consider what uses should occur on Grant County PUD lands, and it designates classifications and uses which are intended, in part, to preserve and protect lands for future development by the Grant County PUD, government agencies, or individuals.

Private hunting opportunities are primarily for the purposes of elk, deer, game bird (pheasant, upland game bird), and migratory waterfowl hunting. Owners either allow free access (“Feel Free to Hunt”) to their property for the purposes of hunting or are enrolled in “Landowner Hunting Permit” Program, where hunting is permitted on based drawing selection held by WDFW or the owner. Other hunting on private lands may be allowed by on-site registration or by written permission.

3.5.4 Route Segment Considerations

3.5.4.1 Zone 1

Route Segment 1a (Agency Preferred Alternative)
Route Segment 1a is located in a low density residential area. There are no recreation areas or significant recreational activities occurring along Route Segment 1a. Refer to Table 3.5-3 for a summary of recreation activities occurring in the Project area.

Route Segment 1b (Agency Preferred Alternative)
Route Segment 1b is located in a restricted area of the JBLM YTC. Private hunting opportunities exist adjacent to the route on private lands.

Route Segment 1c
The primary recreation activity occurring in this area is private land hunting. State lands are crossed for one mile on the west end of the route in the Blackrock designated elk hunting area (WDFW 2011a).

3.5.4.2 Zone 2

Route Segment 2a (Agency Preferred Alternative)
Route Segment 2a crosses private lands potentially open for dispersed hunting activities. Adjacent state lands have limited access.

Route Segment 2b
Route Segment 2b crosses private lands and BLM lands directly south of the JBLM YTC potentially open for dispersed hunting activities. Adjacent state lands and BLM parcels have limited access.

Route Segment 2c (Agency Preferred Alternative)
Route Segment 2c crosses private lands and parallels existing 115 kV and 230 kV transmission lines north of SR 24. This route crosses private lands potentially open for dispersed hunting activities. The adjacent state land is potentially accessible from Badger Lane, but much of it has agricultural leases that limit hunting opportunities. The BLM parcels have limited access.

Route Segment 2d (Agency Preferred Alternative)
Route Segment 2d crosses BLM lands and private lands that have restricted access, and are potentially open for dispersed hunting activities.

3.5.4.3 Zone 3

Route Segment 3a (Agency Preferred Alternative)
Route Segment 3a is a very short route that is adjacent to the Vantage substation. Recreational sites and activities associated with this route include the Wanapum Dam Overlook, Upper Wanapum Dam Boat Launch, Wanapum Heritage Center, and the Wanapum Dam Picnic Area. Existing utility infrastructure severely restricts potential hunting activities around near this route, although Reclamation and lands to the north provide opportunities for dispersed hunting activities.

Route Segment 3b
Route Segment 3b crosses the Columbia River in an area where water related recreation activities occur, and is near the Huntzinger Boat Launch and Wanapum Heritage Center and Picnic Area.

This route crosses in the area of the John Wayne Trail East Army Entrance parking lot on the JBLM YTC. The Project follows the John Wayne Trail from the river crossing to the Beverly Bridge trail crossing for 1.9 miles, where the route continues down the C, M, SP, & P railroad along Huntzinger Road, and crossing the trail in three locations. Hunting is prohibited on the west side of the Columbia River along the John Wayne Trail where the Project is located. South of the Beverly Bridge, recreational activities are associated with water activities along the Columbia River and Priest Rapids Lake. Fishing and boating access primarily occurs from the Huntzinger Boat Launch, located north of the existing and proposed transmission line and river crossing area. Other river access sites are located on the east side of the river in the study area.

Route Segment 3c (Agency Preferred Alternative)
Route Segment 3c crosses the Columbia River approximately 4.5 miles downstream of the Priest Rapids Dam just west of the HRNM/Saddle Mountains NWR. Recreational activities are typically associated with the river in this area (e.g., rafting, fishing, boating, and sight-seeing).

This route crosses the Saddle Mountains MA generally following the existing Hanford-Vantage #1 500 kV transmission line. A portion of the line is located in an area on the western end of the Saddle Mountains Management Area which is designated as "open" to OHV use. The remainder of the transmission line through the Saddle Mountains Management Area is located in an area which is designated as "limited" to designated trails for OHVs (see Appendix A Jurisdiction, Recreation and Special Areas Management map). On the north end of the Saddle Mountains, this route crosses adjacent to the Saddle Mountains Private Hang Gliding Area, and between the Crab Creek Corridor/Burkett Lake Recreation Area and the Beverly Sand Dunes OHV Park.

Route Segment 3c also crosses the Milwaukee Corridor and just west of the Columbia Basin Wildlife Refuge –Lower Crab Creek Units (Nunnally Lake fishing area), and is located adjacent to the Burkett Lake/Crab Creek Corridor Recreation Area. The route segment is approximately a third of a mile east of the eastern shore of the lake. On the north end near the Vantage Substation, the route crosses private and Reclamation lands where dispersed hunting activities may occur. Owners of approximately 12,690 acres of private land are enrolled in the "Feel Free to Hunt" WDFW agreement program within the study corridor of Route 3c on its north end.

TABLE 3.5-3 RECREATION ACTIVITY/AREA SUMMARY BY ALTERNATIVE ROUTE SEGMENT

RECREATION AREA OR ACTIVITY	ZONES/ROUTES									
	ZONE 1			ZONE 2				ZONE 3		
	1a	1b	1c	2a	2b	2c	2d	3a	3b	3c
Federal										
Columbia NWR										X
Columbia River									X	X
HRNM										X
JBLM YTC		X							X	
Saddle Mountains Management Area (BLM)										X
Other dispersed BLM lands (restricted access)					X	X	X			
State										
Beverly Sand Dunes OHV Park										X
Buckshot Boat Launch									X	
Columbia Basin Wildlife Area-Lower Crab Creek										X
Columbia Basin Wildlife Area-Priest Rapids									X	
John Wayne Pioneer Trail/Milwaukee Corridor										
Crosses									X	X
Parallels									X	
County										
Crab Creek Corridor/Burkett Lake Recreation Area										X
Priest Rapids Lake									X	
Priest Rapids Recreational Trail									X	
Wanapum Heritage Center/Picnic Area									X	
Wanapum Dam Overlook								X	X	X
Wanapum Lake								X	X	X
Private										
Dispersed Hunting			X	X	X	X	X		X	X
Wineries										
Saddle Mt. Hang Gliding Launch Site										X

3.6 SPECIAL MANAGEMENT AREAS

3.6.1 Data Sources

Data sources for special management areas (SMAs) come from a number of state and federal sources. Geographic Information System (GIS) shape files of current designations were obtained from the Bureau of Land Management (BLM), federal and state agencies. SMAs typically include designations and allocations such as designated wilderness, special recreation management areas (SRMAs), areas of critical environmental concern (ACECs), and other areas intended to enhance or protect specific qualities over time, and to foster recreation opportunities, ecosystem protection, or historic preservation. Special designations are made by congress or by agencies administratively during the resource planning process.

3.6.2 Current Conditions and Trends, Regional Overview

McCoy Canyon ACEC
McCoy Canyon ACEC consists of 100 acres of BLM land located on the north slope of Umtanum Ridge along the Columbia River. Located two miles west of the Hanford Reach National Monument (HRNM), the ACEC was designated for federal candidate plant species values in the Spokane District Resource Management Plan (RMP) and Record of Decision (ROD) and the 1992 RMP Amendment (BLM 1992) and ROD (Spokane District 1985/1987 RMP and 1992 RMP Amendment/ROD; see BLM 2011); Columbia milkvetch [*Astragalus columbianus*], Hoover's desert-parsley [*Lomatium tuberosum*], and Piper's daisy [*Erigeron piperianus*]).

Sentinel Slope ACEC
Sentinel Slope ACEC, located east of the Project area on the north slopes of the Saddle Mountains Management Area (MA). According to the 2011 Analysis of the Management Situation (BLM 2011), the 200 acre Sentinel Slope ACEC was designated in the 1985 Spokane District RMP and 1987 ROD for the important biological values of a federal candidate plant (Hoover's desert parsley).

Sentinel Butte Dunes
Sentinel Butte Dunes was identified in the Analysis of the Management Situation for the Eastern Washington and San Juan Resource Management Plan (BLM 2011) as an area that has potential for designation as an ACEC. The Sentinel Butte Dunes area is located on the west end of the Saddle Mountains east of the Columbia River. Currently, the Spokane District RMP Revision lists proposed alternatives for the Saddle Mountains area for an Extensive Recreation Management Area (ERMA), with proposed management actions varying by alternative. The proposed alternatives for Rattlesnake Hills include it being listed as neither a SRMA nor an ERMA, but as an "other" category, with proposed management actions varying by alternative. These alternatives may change in response to public comment as the RMP process moves forward. The RMP Revision also will consider the possibility of designation of the Sentinel Butte Dunes as an ACEC (Priebe 2011).

Hanford Reach National Monument
The 195,000 acre (300 square mile) HRNM was established by Presidential Proclamation in 2000, and is located in the Project area along the Columbia River. The HRNM was established around the Hanford Site. The Monument encompasses one of the last free flowing segments of the Columbia River (see Columbia River Eligible Wild and Scenic River below).

HRNM lands are owned and administered by either the Department of Energy (DOE) or U.S. Fish and Wildlife Service (USFWS). The Columbia River Corridor, Wahluke, and Rattlesnake Administrative Units are in the Project area as established in the Final HRNM Comprehensive Conservation Plan and Environmental Impact Statement (USFWS 2008). The Columbia and Rattlesnake Units are DOE owned lands, and the Wahluke Unit is owned by the USFWS. Lands administered by the USFWS include the

Saddle Mountains National Wildlife Refuge, which existed prior to, and was incorporated into, the HRNM when it was established on June 9, 2000.

Columbia National Wildlife Refuge
Portions of the western extremes of Columbia National Wildlife Refuge are located in the Project area along Lower Crab Creek and the northern slope of the Saddle Mountains. The refuge is managed by the USFWS. The Columbia National Wildlife Refuge was established in conjunction with the Columbia Basin Irrigation Project in 1944. The land, water and wildlife of the refuge have been actively managed since 1955.

Yakima Hills Important Bird Area
The Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) has been identified as an Important Bird Area (IBA). The National Audubon Society administers the IBA Program in the United States. JBLM YTC has “Recognized” status under the program. Recognized IBAs are identified IBAs that have been announced to the public. Recognition may mean that a landowner has been notified and has approved of the fact that the property has been identified as an IBA. JBLM YTC is recognized as an IBA based on the greater sage-grouse status as a Global and State Species of Conservation Concern, sage-grouse presence in rare/unique habitat, and as defined by the National Audubon Society, an area having “greater than 1% of the state population” (National Audubon Society 2012).

Columbia Basin Wildlife Area (Lower Crab Creek Unit and Priest Rapids Unit)
The Washington Department of Fish and Wildlife (WDFW) manages approximately 192,000 acres as the Columbia Basin Wildlife Area, with lands owned by Reclamation, Grant County Public Utility District (PUD), the WDFW, the Washington Department of Natural Resources (WDNR), and the USFWS. Lands along Crab Creek and the Priest Rapids Pool were purchased with funds provided by Grant County PUD as mitigation for habitat inundation as a result of the construction of Priest Rapids Dam.

The 24,958 acres Lower Crab Creek Unit includes the Nunnally Lake and Lenice Lake, and provides trout fishing, camping, hunting, wildlife viewing and non-motorized boating activities. The area is managed under the Columbia Basin Wildlife Area Management Plan (WDFW 2006).

The Priest Rapids Unit covers an area of 3,202 acres on the east side of the Columbia River south of the Wanapum Dam. Ownership within the unit is primarily WDFW, with some U.S. Bureau of Reclamation (Reclamation) and BLM included.

Columbia River Eligible National Wild and Scenic River
The Hanford Reach is the only stretch of the Columbia River in the United States that is not impounded by a dam. The Hanford Reach of the Columbia River and public lands within 0.25 mile was recommended for inclusion (eligible) in the National Wild and Scenic Rivers system as a “Recreational River” as a result of a study conducted by the National Park Service (NPS 1994). The study also addressed “suitability” of Hanford Reach for designation, concluding that the river segment is suitable for designation. Congress has not acted upon this recommendation; however, subsequent legislation placed the river in permanent study status. The NPS found that the Hanford Reach supported the following seven outstandingly remarkable resources (ORRs):

- Fall-run Chinook salmon along with their spawning and rearing habitat.
- The intact ecosystem of the river and adjacent Wahluke Slope.
- American Indian cultural resources.
- Archeological artifacts and sites.
- Hydrology and geology.

- Federally recognized rare animal species.
- Federally recognized rare plant species.

3.6.3 Current Management Considerations

BLM
Lands under the jurisdiction of the BLM in the Project area are managed in accordance with the Spokane District 1985/1987 RMP and 1992 RMP Amendment/ROD. The Planning Area consists of two Resource Areas: the Wenatchee Resource Area and the Border Resource Area (see Section 3.4 Land Use and Jurisdiction). The RMP is currently in the process of being updated (Eastern Washington and San Juan Resource Management Plan).

Hanford Reach National Monument
The Columbia River Corridor, Wahluke, and Rattlesnake Administrative Units are in the Project area as identified in the Final HRNM Comprehensive Conservation Plan and Environmental Impact Statement (2008). Although the river is open and accessible to the public, the Columbia River Corridor and Rattlesnake Administrative units (adjacent to and south of the river, DOE owned lands) are closed to public use with the exception of the area north and west of Vernita Bridge. The Wahluke Administrative Unit, located on lands owned by the USFWS, is open. Access is controlled, with "many/most" public uses allowed; hunting is not allowed.

Columbia National Wildlife Refuge
Beginning in June of 2006, the Columbia National Wildlife Refuge is currently in the process of developing a Comprehensive Conservation Plan (CCP). The Draft CCP will be released for public review during the spring of 2011.

JBLM YTC IBA
The goal of the IBA program is to identify the most essential areas for birds, monitor those sites for changes to birds and habitat, and work with land owners and managers to conserve these areas for long term protection. Recognition of JBLM YTC as an important sage grouse area does not require landowner approval and does not compel land owners to manage or preserve property in any specific manner.

Columbia Basin State Wildlife Area
The Columbia Basin State Wildlife Area, which includes the Lower Crab Creek and Priest Rapids Units in the Project area, is managed under the 2006 management plan (WDFW 2006). Management goals for the Columbia Basin Wildlife Area "are to preserve habitat and species diversity for both fish and wildlife resources, maintain health populations of game and non-game species, to protect and restore native plant communities, and provide diverse opportunities for the public to encounter, utilize, and appreciate wildlife and wild areas."

The primary management concerns and public issues identified as stated in the plan for the Columbia Basin Wildlife Area include:

- Balancing recreational activities against wildlife and habitat impacts.
- Manage primarily for migrant waterfowl, upland game birds and priority species.
- Control noxious weeds and other undesirable vegetation.
- Maintain enhanced wildlife habitats and preserve native plant communities and important habitats.
- Restore and preserve shallow water habitat and ponds.
- Litter, vandalism and enforcement.

Columbia River Eligible National Wild and Scenic River

The eligible portion of the Columbia River has been placed into indefinite protection status under Public Laws 100-605 & 104-333, Section 404. Legislation placed the river in permanent study status. The eligible section begins one mile downstream from the outflow of the Priest Rapids Dam (free flowing river section) near the Yakima-Grant-Benton County line and includes approximately 0.25 mile on each side of the river. The USFWS, who has oversight responsibility, manages the proposed “Recreational River" in such a manner as to protect and enhance the values which caused it to be recommended for inclusion in the National Wild and Scenic Rivers System. Federal agencies engaged in projects that may affect water resources must comply with Section 5(d) of the Wild and Scenic Rivers Act and 1979 Presidential Directive on avoiding or mitigating direct and adverse impacts to rivers eligible for designation, and projects must be evaluated to determine whether there will be direct and adverse effects on the values for which the river segment is under study. If the Secretary (of the Interior) determines that there will be direct and adverse effects that have not been adequately mitigated, he shall notify the sponsoring entity and the Committee on Interior and Insular Affairs of the U.S. House of Representatives and the Committee on Energy and Natural Resources of the U.S. Senate of his determination and any proposed recommendations (USFWS 2011). Under the Wild and Scenic Rivers Act and Department of the Interior practices, USFWS will manage the river as if it was a designated Wild and Scenic River and will take no actions that would change its status. Other agencies are obligated to take all reasonable care to protect the rivers free flow and ORRs, but they are not obligated to forego projects if no reasonable alternative exists (USFWS 2008).

3.6.4 Route Segment or Zone-Specific Considerations

3.6.4.1 Zone 1

Route Segment 1a (Agency Preferred Alternative)

There are no SMAs associated with Route Segment 1a.

Route Segment 1b (Agency Preferred Alternative)

Route Segment 1b is located within the JBLM YTC, which has been identified as an IBA.

Route Segment 1c

There are no SMAs associated with Route Segment 1c.

3.6.4.2 Zone 2

Route Segment 2a (Agency Preferred Alternative)

There are no SMAs associated with Route Segment 2a.

Route Segment 2b

There are no SMAs associated with Route Segment 2b.

Route Segment 2c (Agency Preferred Alternative)

There are no SMAs associated with Route Segment 2c.

Route Segment 2d (Agency Preferred Alternative)

The McCoy Canyon ACEC is within one mile of Route Segment 2d.

3.6.4.3 Zone 3

Route Segment 3a (Agency Preferred Alternative)

There are no SMAs associated with Route Segment 3a.

Route Segment 3b
The southern portion of Route Segment 3b is located within 0.25 mile of the Eligible Columbia River Wild and Scenic River (WSR) along the southern bank of the river; however, no public lands are crossed in this location.

Route Segment 3c (Agency Preferred Alternative)
On the south end of the route, McCoy Canyon ACEC is within one mile of Route Segment 3c, is adjacent to the HRNM, and it crosses the Eligible Columbia River WSR and is located on public lands within 0.25 mile of the river. On the north end of the route, the route segment is adjacent to the Columbia NWR and the Lower Crab Creek Unit of the Columbia Basin Wildlife Area, but does not cross either.

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3.7 TRANSPORTATION

The regional roadway network in and around the Project area is managed by Grant County, Kittitas County, Yakima County, and the state of Washington. There are no Benton County managed roads within the Project area. State highways are managed by the Washington State Department of Transportation (WSDOT). There is also a network of improved, but unpaved roads managed by the Bureau of Land Management (BLM) and the Bureau of Reclamation (Reclamation) that provide access to their lands and irrigation facilities. Aviation facilities are described in Section 3.4 Land Jurisdiction and Land Use.

3.7.1 Data Sources

This section was prepared using information from a variety of federal, state, and local planning documents, including:

- WSDOT State Transportation Improvement Program 2011-2014
- Grant County Public Works website, Current Construction 2011
- Grant County Comprehensive Plan 2006
- Grant County Comprehensive Six-Year Transportation Improvement Program 2009-2014
- Kittitas County Roadway Improvement Projects 2010-2011
- Kittitas County Long-Range Transportation Plan 2008
- Kittitas County Six-Year Transportation Improvement Program 2011-2016
- Yakima County Public Works Projects 2010-2011
- Yakima County Plan 2015 Volume I
- Yakima County Comprehensive Six-Year Transportation Improvement Program 2011-2016
- Analysis of the Management Situation for the Eastern Washington and San Juan Resource Management Plan (BLM 2011)

Additional policy and procedural guidance was obtained from the following sources:

- Federal Land Policy and Management Act of 1976, as amended.
- BLM Land Use Planning Handbook (H-1601-1).
- BLM National Environmental Policy Act Handbook (H-1790-1).
- Bureau of Reclamation, Reclamation Project Act of 1939 (53 United States Code [U.S.C.] 1187).
- Bureau of Reclamation, Reclamation Manual
- Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).

The information from these sources was used to determine the existing transportation conditions within the Project area.

3.7.2 Current Conditions and Trends, Regional Overview

For the purposes of this analysis, the Project area was defined to include the transportation infrastructure located within a two mile corridor; one mile either side of alternative route segment center lines. To provide additional context, regional highways outside of the analysis zones are also described. Each component of the regional transportation network is described below. The analysis considered issues related to transportation in the area raised during the public scoping process. Scoping comments included concerns for a potential increase in the use of Washington Department of Natural Resources (WDNR) and unauthorized access to state lands, and private property access road impacts, state highway access for Project construction, operations and maintenance or crossing

3.7.2.1 State Routes

The state highway "state routes" system forms the primary road network within the Project area. In the region, including all four counties, the state highway system serves statewide, regional, and local traffic demands. The main roadways in Grant, Kittitas, and Yakima Counties include Interstate 82, Washington State Route 24 (SR-24) and Washington State Route 243 (SR-243). Highways just outside the Project area include Interstate 90 to the north, U.S. Highway 12 to the west and Washington State Route 26 (SR-26) to the northeast.

Interstate 82 (I-82) is a major east-west freeway which connects I-90 to the north, and I-84 to the south in Oregon. The interstate allows direct connectivity to major urban areas of Seattle, Washington and Boise, Idaho. Locally, the interstate serves the City of Yakima. The interstate is four lanes with a major divider and shoulders on each side which are typically six feet wide. Traffic operations along the major interstate highway are characterized by relatively free flowing traffic with no controlled intersections; speed limits are 70 MPH when no construction is occurring.

SR-24 is an east-west highway of major regional importance. The highway connects I-82 and the City of Yakima to cities further east where it intersects SR-26. The highway is two-lanes with a speed limit varying between 35 and 55 miles per hour (mph), depending on proximity to population areas. Roadway shoulders on both sides are typically four to six feet wide and partially paved. The highway is relatively free flowing with some stops at signalized or stop sign controlled intersections.

SR-243 is a north-south highway of minor regional importance. The highway connects SR-24 at the south terminus and SR-26 at its north terminus, as well as connecting travelers in southern Grant County to I-90. The route travels through southern Grant County and within proximity of the population centers of Desert Aire, Mattawa, Beverly, Schawana, and Vantage. The highway is two-lanes with a speed limit varying between 35 and 55 mph, depending on proximity to population areas. Roadway shoulders on both sides are typically four to six feet wide and partially paved. The highway is relatively free flowing except in more densely-populated areas with more frequent stops at signalized or stop sign controlled intersections.

3.7.2.2 County Roads

County roads are an important part of local travel system. Grant, Kittitas and Yakima Counties use the nine different federal functional classifications (FFCs) – six urban and three rural classifications, as follows:

- *Urban Principal Arterials (FFC 14):* provide a network of streets and highways that can be identified as unusually significant. They are important both because they provide routes for traffic passing through the area and because they provide routes for movements within the urbanized area. Access to these routes is usually limited to intersections.
- *Urban Minor Arterials (FFC 16):* connect with and augment principal arterials, serving trips of moderate length. They place more emphasis on access than principal arterials, but still emphasize mobility over access. These streets provide continuity within communities.
- *Urban Collector Arterials (FFC 17):* provide both access service and traffic circulation within neighborhoods. These streets also collect traffic from local streets in neighborhoods and channel it to arterials.
- *Urban Local Access (FFC 19):* provide direct access to abutting properties and to the higher classification facilities. Service to through traffic is usually discouraged.
- *Rural Major Arterials (FFC 02):* connect rural communities to each other and to urban areas.

- *Rural Minor Arterials (FFC 06):* in conjunction with Rural Major Arterials, the rural minor arterials form a rural network that links cities together with other major traffic generators. Minor arterials should be expected to provide for relatively high overall travel speeds with minimum interference to through movement.
- *Rural Major Collectors (FFC 07):* provide service to larger towns and traffic generators of importance. They link population centers and serve important travel corridors within the County.
- *Rural Minor Collectors (FFC 08):* collect traffic from local access roads and provide access to major collectors. They link smaller communities and locally important traffic generators.
- *Rural Local Access (FFC 09):* provide access to adjacent land. They are used to travel relatively short distances.

According to the 2006 Grant County Comprehensive Plan, the Grant County roadway system is comprised of 2,507 miles of roadways. Of the total road miles, 98.5 percent are classified as Rural Roads and the remaining 1.5 percent are classified as Urban Roads. In terms of surface types, 1,277 miles are hard-surfaced with asphalt concrete pavement (ACP), bituminous surface treatment (BST or "chip seal"), or Portland cement concrete pavement (PCCP). The remaining 1,231 miles, are gravel surfaced.

According to the 2008 Kittitas County Long Range Transportation Plan, the Kittitas County roadway system is comprised of 565 miles of roadways. Of the total road miles, all (100 percent) are classified as Rural Roads. In terms of surface types, 512 miles are hard-surfaced with ACP or BST or "chip seal". The remaining 53 miles, are gravel surfaced.

According to the Yakima County Six-Year Transportation Improvement Program, the Yakima County roadway system is comprised of 1,655 miles of roadways, a total of 514 miles are within the Yakama Indian Reservation. Of the total road miles, including those in the Yakama Indian Reservation, 1,488 (89.9 percent) are classified as Rural Roads, and the remaining 167 (11 percent) miles are classified as Urban Roads. In terms of surface types; three miles are PCCP, 106 miles are ACP, 990.93 miles are BST, and the remaining 556 miles are gravel surfaced.

Most county roads are two lanes wide. Paved roads are generally 24 feet wide with two-foot gravel shoulders on both sides. Gravel roads are generally 24 feet wide with no shoulder and dirt roads, if any, are generally 20 feet wide with no shoulders. The majority of roads in the three counties exist in a 60-foot ROW, although in some cases that may be wider. The counties maintain paved roads, which are comprised of a BST surface, by chip-sealing on either a regular schedule or as-needed. Gravel and dirt roads are "bladed" throughout non-winter months to provide a smoother surface for vehicle travel.

Much of the traffic on the county roads is primarily for local use. Local use traffic in all three counties consists of residents traveling into the largest city center or to the interstate or state highway. Additionally, during planting and harvesting seasons there is much agricultural-related traffic between fields. The traffic generated is often from farm-implements or tractor-trailers which may be considered oversized loads and requires precaution by both the operator and other drivers.

In Grant County, the major roads in the Project area run along the section lines to provide a grid-like pattern and include:

- Lower Crab Creek Road, a Rural Road extending east-west along the northern boundary of the Saddle Mountains and along the Lower Crab Creek Wildlife Area. This is a major route which serves the Lower Crab Creek Wildlife Area, as well as Beverly and Smyrna. The road is accessed from SR-243 from the west.

- Road O SW, a Rural Road extending north-south through mainly agricultural lands that is primarily a local use road. The road runs through the western edge of Mattawa and connects between SR-243 to the south, and Road 24 SW its northern terminus. The road is two-lane and paved.

- Road 24 SW, a Rural Road extending east-west through mainly agricultural lands that is primarily a local use road. The road runs along through the central portion of Mattawa, with an eastern terminus at SR-24 and a western terminus at SR-243. The road is two-lane and paved.

- Road N SW, a Rural Road extending north-south through mainly agricultural lands that is primarily a local use road. The rural road designation applies primarily to the southernmost portion of the "Road N alignment". There is no county ROW along most of this alignment. The unpaved Road N alignment road runs intermittently between parcels with crop production, there is no opportunity for thru-traffic. The road does not go any further north than Road 25.5 SW. To the south, the road ends approximately a 0.25 mile south of its intersection with Road 29.5 SW. The road is two-track to two-lane and is not paved.

- Road 27 SW, a Rural Road extending east-west through mainly agricultural lands that is primarily a local use road. The road runs along through the central portion of the study area within Grant County, with an eastern terminus at Road K SW and a western terminus at SR-243 near Desert Aire. The road is two-lane and paved.

In Kittitas County, the major roads in the Project area include:

- Huntzinger Road, a Rural Road running along the eastern boundary of the Yakima Training Center in a north-south direction. The road provides access to residences and agricultural operations which also border the western shore of the Columbia River, as well as providing access to the Wanapum Dam. The road travels from the north, out of the Project area and into the town of Vantage. To the south, the road changes surfaces from paved to gravel adjacent to the Auvil Fruit Company agricultural area.

In Yakima County, the major roads in the Project area include:

- Sage Trail Road, a Rural Road extending east from its western access point at East Selah Road. East Selah Road accesses I-82, as well as the Pomona Heights Substation. The road serves residences in the Yakima Ridge foothills. The road is primarily chip-sealed but becomes gravel layered further west as it turns into John Street and a network of gravel and dirt meandering roads mainly used to access homes or the Joint Base Lewis-McChord Yakima Training Center (JBLM YTC).

- Mieras Road, a Rural Road running east from Birchfield through agricultural and large-lot residential areas. The road starts near the western edge of Yakima in the town of Birchfield and meets its eastern terminus at the intersection of Coombs Road. The road is two-lane and either paved or chip-sealed.

- Postma Road, a Rural Road extending east from its intersection with Beaudry Road to the west, through Moxee and further east through agricultural and large-lot residential areas. Postma Road meets its eastern terminus 0.75 mile west of the JBLM YTC. The road is two-lanes and either paved or chip-sealed.

Coombs Road and Prairie Road are Rural Roads which run south between Mieras Road and Postma Road. They are two-lane paved or chip-sealed roads.

Average annual daily traffic (AADT) data was obtained where available for roads in the Project area. Table 3.7-1 below shows AADT volumes in 2010 for roads in the Project area.

TABLE 3.7-1 ROAD AADT IN PROJECT AREA

ROAD AND LOCATION	TRAFFIC VOLUME (AADT)
I-82	
After Ramp Union Gap	7,900
SR 24	
Between Beane Rd & Den Beste	2,400 - 3,000
SR 243	
After Junction with SR 24 Wye Connection	2,900
Before Junction w/Road 24 SW	4,400
After Junction w/RD 24 SW	4,200
After Junction w/A Street	3,500
After Junction Beverly-Burke Road	2,500

Source: WSDOT 2010a.

3.7.2.3 Roads on BLM and Reclamation Administered Lands

The BLM has jurisdiction over 98,383 acres within Grant, Kittitas, and Yakima Counties. All of the BLM roads are gravel or native material. The primary function of these roads is to provide access for ranching and recreational use activities occurring on BLM lands.

BLM roads are categorized into five "maintenance levels" based on their function, physical condition, and use. These levels are identified as follows:

- Level 1 is assigned to roads that receive no scheduled maintenance, but are still open to vehicular traffic.
- Level 2 is assigned to roads classified as resource roads that receive maintenance every eight to ten years. Emphasis is normally given to maintaining drainage facilities and runoff patterns. These roads provide access to open BLM lands and traffic is normally minor.
- Level 3 is assigned to roads classified as local roads that receive maintenance every three to five years and are seasonal in nature or occasionally open all year.
- Level 4 is assigned to roads classified as local roads that receive maintenance every three to five years and generally kept open all year or have high seasonal use.
- Level 5 is assigned to roads classified as collector roads that are maintained each year. These roads receive the highest use and have a gravel surface.

Most of these roads function to provide access for ranching and recreational users are designated Maintenance Level 3 or 4.

The BLM has scattered parcels in each of the three counties within the Project area, as well as a larger, contiguous area in the Saddle Mountains. Roads are primarily considered to be off-highway vehicle (OHV) use. Within the Saddle Mountains Management Area (MA), the BLM has designated lands as either "Open" for off road use, or "Limited" road restricted use. The southeast side of the Saddle Mountains MA is designated as "Limited" access for OHV use, and most of the northwest side of the

Saddle Mountains MA is designated as "Open" access for OHV use (see Appendix A- Jurisdiction, Recreation and Special Management Areas Map). In total, approximately 4,300 acres are designated as "Open" and 18,700 acres are designated as Limited within the Saddle Mountains MA.

Reclamation also regulates roads for public or private use on Reclamation land, and the Reclamation's focus in the Project area is water-related projects such as dams, reservoirs, and irrigation. Roads are primarily used for accessing those facilities. Reclamation does not have maintenance levels or classifications for their road system, roads are either paved or gravel and maintained on an as-needed basis.

3.7.2.4 Navigable Waterways

The U.S. Army Corps of Engineers (USACE) has jurisdiction authorizing certain structures or working in or affecting navigable waters of the United States pursuant to Section 10 of the Rivers and Harbors Act of 11899. Navigable waters of the United States are defined in the Code of Federal Regulations (33 C.F.R. 329.4).

Navigable waterways within the Project area consist of the Columbia River. The Columbia is a designated navigable waterway its entire length in the United States. The river has been and continues to be a major source of transportation, electricity, irrigation, and fishing. The Wanapum Dam and Priest Rapids Dam have essentially created two lakes along the river in the Project area, the Wanapum Lake and Priest Rapids Lake.

According to 33 C.F.R. 322 "Permits for Structures or Work in or Affecting Navigable Waters of the United States", Section 322.5(i)(1) (Special Policies/Power Transmission Lines), a Section 10 permit would be required for power transmission lines crossing navigable waters of the United States. The proposed Project requires a Section 10 permit. The USACE also authorizes the acceptable clearances for conductors crossing navigable waters.

3.7.3 Current Management Considerations

3.7.3.1 Federal and State Highways

Federal and state highways are under the jurisdiction of state level transportation agencies, in this case WSDOT is the regulatory agency for I-82, SR-24, and SR-243. Management considerations and decisions are based on a multi-year plan, which is updated every year by WSDOT and approved by the Federal Highway Administration. This plan, the Statewide Transportation Improvement Program (STIP; WSDOT 2010b) is for the years 2011-2014. The WSDOT STIP provides planning guidance, necessity, and cost to programs such as road improvements, new road projects, and future transportation-related studies.

There is one planned project within the 2011-2014 STIP which will occur within the study area. This project is for an intersection rehabilitation/improvement for SR-243 within Mattawa. This project is expected to be completed in October 2012.

There are no other projects within the STIP which may occur within Grant, Kittitas, Benton, and Yakima Counties.

3.7.3.2 County Roads

County roads are under the jurisdiction of each respective county's road or public works department. Each County has a management plan, similar to a STIP, which provides planning guidance, necessity, and cost to programs such as road improvements, new road projects, and future transportation-related studies.

Grant County utilizes a Transportation Improvement Program (TIP) known as the Grant County Comprehensive Six-Year TIP for 2009-2014.

Within the Project area, the following road will have some sort of work per the 2009-2014 TIP:

- Road O SW received rehabilitation and improvements in the form of grading, drainage, and new surface overlay in 2009.

Kittitas County utilizes a TIP known as the Kittitas County Six-Year TIP for 2011-2016. The County also publishes a document of on-going projects every two years, currently known as the Kittitas County Roadway Improvement Projects of 2010-2011. Within the Project area, there are no roads receiving rehabilitation or improvements per the 2011-2016 TIP. However, it should be noted that all roads receive a new layer of BST, which is a thin layer of liquid asphalt covered with an aggregate, every seven years.

Yakima County utilizes a TIP known as the Yakima County Comprehensive Six-Year TIP for 2011-2016 for roadway system management. Within the Project area, there are no roads which will be receiving rehabilitation or improvements per the 2011-2016 TIP. However, it should be noted that all arterial roads receive a new layer of BST per determination through the Pavement Management System. Due to the number of gravel or dirt roads within the Project area, blading is likely to be ongoing as part of the maintenance and erosion prevention of those roads.

3.7.3.3 Roads on BLM and Reclamation Administered Lands

Roads on BLM and Reclamation administered lands are often maintained and improved on an as-needed basis. Improvements or rehabilitation may require blading and grading to prevent further erosion and laying down additional gravel to make a more passable and safer traveling route.

3.7.4 Route Segment or Zone-Specific Considerations

3.7.4.1 Zone 1 - Overview

The roads in this zone are predominantly two-lane, two-way and unpaved with low traffic volumes. Route Segment 1a (Agency Preferred Alternative) would parallel Sage Trail Road and Christine Drive/John Street. Route Segment 1b (Agency Preferred Alternative) would extend onto the JBLM YTC parallel to an existing fire break road along the base boundary.

The transportation network in Kittitas Canyon where Route Segment 1c parallels and ascends Yakima Ridge is very sparse. Roza Hill Drive, Summerset Drive, Maple Place, Bohoskey Drive, Lamb Road, E. Norman Road are existing unpaved roads that would provide access along Route Segment 1c. As the route extends south of the JBLM YTC, it turns east and would parallel Mieras Road, a two-lane paved road, for about 1.25 miles until the road ends.

3.7.4.2 Zone 2 - Overview

The road network in Zone 2 is undeveloped, consisting of a limited number of dirt roads and two-track roads that extend from SR-24 and Deeringhoff Road across rangeland and cultivated farmland. The Bonneville Power Administration (BPA) Midway-Moxee 115 kV transmission line and the PacifiCorp Union Gap – Midway 230 kV transmission line have existing access roads generally parallel to the lines within the existing right-of-way (ROW) of the lines and accessible from SR 24.

3.7.4.3 Zone 3 - Overview

Route Segment 3a (Agency Preferred Alternative) would be accessible from the two-lane paved access road to the Vantage Substation that extends from SR-243.

Route Segment 3b runs along the western banks of the Columbia River. In Benton County, access to this route segment would be from BPA's paved access road to the Midway Substation that extends from SR-24 and across an orchard access road to a point where the road transitions into the abandoned Chicago, Milwaukee, St. Paul, and Pacific (C, M, SP, & P) railroad bed ROW. In Kittitas County, this route segment would be located parallel to Huntzinger Road to the south end of the Auvil Fruit Company. Just south of the Wanapum Dam, the route segment crosses the Columbia River to the Vantage Substation. The route segment would cross SR-243 north of Beverly as well as cross some dirt farmland access roads.

Route Segment 3c (Agency Preferred Alternative) is located in the eastern part of the Project area generally in a north-south orientation. The Route crosses the Columbia River and SR-243, and then runs mainly along Road N SW, Reclamation access roads and Road O SW. As the Route crosses Road 24 SW, it starts to turn in a northwest direction away from County roads and onto BLM lands. The BLM lands and access roads on Saddle Mountain where this route segment would be located can be accessed from Road R SW. This route crosses Limited use and Open use areas of the Saddle Mountains MA. Placing the transmission line within the ROW of Road 24 SW, Road N SW and Road O SW as well as crossing Road 24 SW and Lower Crab Creek Road would require approval by Grant County.

Authorization to span the Columbia River for Route Segment 3b or 3c would be required from the USACE through the Section 10 Rivers and Harbors Act permitting process. Permission to span SR-243 for Route Segment 3b or 3c would be determined by WSDOT.

3.8 VISUAL RESOURCES

This section documents existing visual resources in the Project area. Visual resources were inventoried and characterized in a 6.0-mile wide study corridor (3.0 miles on either side of the route segments).

3.8.1 Data Sources

The visual resource inventory consisted of a scenic quality and existing development character evaluation, a viewer sensitivity analysis, and an inventory of the regulatory framework for jurisdictions crossed by the Project. A site reconnaissance was conducted during May 2011 for the purposes of evaluating and confirming scenic quality and development character, visibility and visual sensitivity analysis, and identifying Inventory Observation Points (IOPs) and Key Observation Points (KOPs).

Data sources included secondary sources from planning documents, online resources, U.S. Geological Survey (USGS) and aerial mapping, agency sources and studies conducted by the Bureau of Land Management (BLM). A previous visual resources inventory study developed for the BLM Spokane District as part of the planning effort (Visual Resource Inventory) in support of the Resource Management Plan (RMP) update was utilized for this study. Data obtained from the study included Scenic Quality Rating Units (SQRUs), Sensitivity Level Rating Units (SLRUs), Distance Zones (DZs) and other data used in the development of the planning area Visual Resource Inventory (VRI) Classes.

The data incorporated into this assessment from the BLM Visual Resource Inventory was limited to Scenic Quality Classes (A, B, and C) and sensitivity levels. Scenic quality was incorporated and expanded upon in areas that were not inventoried, and sensitivity levels were used on BLM lands.

3.8.2 Current Conditions and Trends, Regional Overview

3.8.2.1 Overview of Study Methodology and Analysis Area

The study approach follows the procedures identified in the BLM's Visual Resource Management (VRM) system as detailed in the Inventory Manual H8410-1 (BLM 1986a), Management Manual 8400 and Contrast Rating Manual 8431-1 (for impact assessment) (BLM 1986b), with modifications appropriate to the proposed Project and lands not under the jurisdiction of the BLM in developed areas. These modifications allow a consistent and equal level of analysis across all alternatives for comparative purposes while following the requirements of the VRM and BLM policy.

The analysis considered issues raised during the public scoping process. Scoping comments included general concerns for scenic views and visual quality impacts, visual impacts on tourism, views from residences to the Cascade Mountains (Mt. Adams and Mt. Rainier), views of recreationists using the Columbia River to the Chicago-Milwaukee-St. Paul-Pacific (C, M, SP, & P) Railroad route, and desired consideration of the aesthetic values of vineyards and wineries. These comments were considered during the data collection efforts and analysis of visual resources within the Project area.

The inventory approach generally consisted of the following tasks:

1) Identification of potentially sensitive viewpoints and KOPs (representative views from potentially sensitive areas) and an assessment of the potential project visibility from these viewpoints using KOP field inventory form documentation, viewshed modeling, and field verification. This task includes an evaluation viewpoint sensitivity level in terms of high, moderate, and low sensitivity using distance zones;

2) Classification of existing scenic quality (where none has been established by the BLM) in natural, undeveloped landscapes; or the evaluation of existing development characteristics for potential project compatibility in urban or culturally dominated landscapes; and
3) Identification of federal and local agency visual resource management goals and objectives (Scenic Overlay Areas, VRM Inventory Classes, etc.) with jurisdiction over the project.

Secondary data was initially collected on land use features that may have visual sensitivity. A sensitivity analysis was conducted based on existing land use, types of users (agricultural workers, commuters, recreationists), use levels (intensive, high volume use, occasional), viewing duration (long duration of stationary viewers, short duration of highway travelers), public interest, users attitudes toward change in the landscape, adjacent land uses, and special designation status (e.g., areas of critical environmental concern [ACECs] with scenic values). Data also came from county and federal planning documents, BLM databases, and existing online databases (e.g., Washington State Department of Transportation [WSDOT], Geocommunicator, Recreation.gov, Recreation-Public Lands Information Center, and Washington Department of Fish and Wildlife [WDFW]). Use data from WSDOT (e.g., average daily traffic) was collected to determine relative volumes of use or was estimated based on road county road status (e.g., major arterial, minor arterial, collector). Initial data collection was followed by ground reconnaissance and a supplemental data collection effort conducted in May 2011 to verify potentially sensitive areas and document any additional potentially sensitive areas. Final sensitivity levels (high, moderate, low) were assigned to points or corridors to be used in the viewshed and impact modeling. Visual sensitivity on BLM lands were obtained from the VRI conducted in 2010. Each sensitive area or corridor was documented using a KOP inventory form documenting viewing conditions, existing uses, landscape context, and other pertinent features. These forms were also used to support the subsequent completion of Contrast Rating Worksheets (8400-4; see Section 4.8-Visual Impacts).

Viewer sensitivity was determined during the sensitivity analysis. Sensitive viewers were determined by an inventory of existing land uses in the Project area. Visual sensitivity levels vary according to the types of users and their attitudes toward change in the landscape. Local, regional, or national significance of recreation viewpoints and travel routes was used to establish the attitudes of viewers. Views from communities and residences were all considered highly sensitive. Recreation viewpoints may be highly sensitive. However, some views from recreation areas are of less concern than others. Travelers on some highways and other roads may be less sensitive to changes than others. For example, some travel routes, used on a regular basis for going to and from work, are less sensitive than others used for scenic drives or as a route to a recreation destination of particular importance.

Views with longer duration are typically more sensitive than those with shorter duration. For example, residents viewing the landscape from their homes every day (long duration) are more sensitive than a tourist viewing the landscape while traveling through the area on a highway (short duration). Refer to Appendix C-1 – Sensitive Viewpoints: Definitions, Criteria and Viewpoint Summary Table.

Each viewpoint or area was assigned a value of high, moderate, or low for the volume of potential viewers who may be viewing a given area. While views seen by large numbers of people may potentially be more sensitive, a high volume of viewers who have no concern for the change would not warrant an increase in the visual sensitivity level. Using these criteria, views were assigned a final sensitivity level of high, moderate, or low on all non-BLM lands.

Scenic quality is a measure of the visual appeal of a natural landscape (landscapes that are not dominated by development). Scenic quality is classified in terms of visual diversity, cohesion, harmony of landform, water and vegetation. Scenic quality is based on the evaluation of seven key factors: landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications, and is expressed as Class A, Class B, or Class C. During the rating process, each of these factors are ranked on a comparative basis with similar features within the physiographic province. The sum of the numeric values for these elements determines the scenic quality class. Ratings of Class A (distinctive or unique), B (above average), or C (common or representative) were assigned. Scores of 25 or more receive Class A ratings, scores of 18 to 24 receive Class B ratings, and scores below 17 receive Class C ratings. Scenic Quality Classes are defined as follows:

Class A - Outstanding areas where characteristic features of landform, rock, water, and vegetation are distinctive or unique in the context of the surrounding region. These features exhibit considerable variety in form, line, color, and texture.

Class B - Above average areas in which features provide variety in form, line, color, and texture and, although the combinations are not rare in the surrounding region, they provide sufficient visual diversity to be considered moderately distinctive.

Class C - Common areas where characteristic features have little variation in form, line, color, or texture in relation to the surrounding region.

Existing scenic quality classes were established by the BLM were used for the scenic quality analysis, and data gap areas were identified. The analysis of scenic quality in undeveloped areas not previously inventoried by the BLM during the VRI process began with a review of existing topographic maps, aerial photographs, and other environmental data (vegetation, water features, etc.). Preliminary rating units were developed based on similar landform, vegetation and water features, and mapped at 1:24,000 scale. These maps were used in the field to verify, and adjust if necessary, unit boundaries, and to rate scenic quality using BLM Form 8400-1. Final scenic quality was documented and mapped as Class A, B, or C.

Agency management objectives were determined by a review of existing plans and policies of federal, state, and local planning documents. BLM VRM Classes establish specific values on the management of visual values. BLM Interim VRM Management Classes were developed by the Spokane District Office. VRM Classes are assigned through the RMP process. The assignment of visual management classes is ultimately based on the management decisions made in RMPs. Interim visual management classes are established where a project is proposed and there are no RMP approved VRM objectives. These classes are developed using the VRM methodology and must conform to the land-use allocations set forth in the RMP which covers the Project area.

As established by BLM Manual H-8410 (BLM 1986a), VRM Classes Objectives are as follows:

Class I: The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.

Class II: The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Class III: The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

Class IV: The objective of this class is to provide for management activities which require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

3.8.2.2 Regional Setting and Landscape Character

The Project area is located in south-central Washington generally between the Columbia River and Yakima River in the Walla Walla Plateau Section of the Columbia Plateau Physiographic Province (Fenneman 1931). The Project area contains two general ecosystem types: the Columbia Plateau Yakima Folds and Columbia Plateau Pleistocene Lake Basins Level IV regions (EPA 2011). The Walla Walla physiographic section is generally characterized by a rolling plateau with young, incised valleys. East-west trending anticlinal ridges, including the Yakima Ridge, Umtanum Ridge and Saddle Mountains are generally parallel, enclosing structural basins that are both topographic features and drainage basins. The ridges generally rise about 2,000 feet above the valleys, are even-crested and smooth sided, not forested. The streams draining the ridges are formed by dense network of smaller tributaries forming a dendritic pattern, typically with associated riparian vegetation. The major drainages (e.g., Columbia River, Yakima River, and Crab Creek) are dominant water features in the region. Sagebrush and native warm season grasses dominate the ridge landscapes along with other low growing vegetation such as cheatgrass. In the valleys, irrigated agricultural development covers large areas. There are pockets of special landforms that deviate from the predominant landscape. Sand dunes, vernal pools, canyons occur throughout the Columbia Plateau province.

3.8.2.3 Natural and Developed Settings

The Project is located in Yakima, Benton, Grant and Kittitas Counties in a mix of private and public owned lands. The Joint Base Lewis-McChord Yakima Training Center (JBLM YTC), Bureau of Reclamation (Reclamation), BLM and state (e.g., WDFW) lands comprise most of the publicly owned lands. United States Department of Energy (DOE) and United States Fish and Wildlife Service (USFWS) lands are also located in the Project area (see Section 3.4 – Land Jurisdiction and Land Use).

The majority of undeveloped natural settings occur within or adjacent to the JBLM YTC, along Yakima Ridge, the Rattlesnake Hills, the Saddle Mountains, and in the Lower Crab Creek Valley. Major geographical features in the Project area include the rivers and river valleys of the Yakima River and Columbia River. The Selah Valley and Moxee Valley occur along the Yakima River. Other valleys in the Project area include the Black Rock Valley and the Cold Creek Valley.

Yakima Ridge stretches along the southern end of the Project area and the south border of the JBLM YTC. Umtanum Ridge borders the south side of the Columbia River south of Priest Rapids Dam into Hanford Reach National Monument and Hanford Reach section of the river. The Rattlesnake Hills occur on the southern boundary of the Project area, with Black Rock Valley bordering its' north side. Selah Valley occurs along the Yakima River generally north of Pomona Heights Substation north and east of Selah. The Wahluke Slope occurs east and northeast of the Priest Rapids Dam and south of the Saddle Mountains, located on the north end of the Project area. The Wahluke Slope is a major agricultural area in the region.

The uplands of the JBLM YTC, Yakima Ridge, Rattlesnake Hills, Saddle Mountains and other higher elevation "steppe" areas are dominated by sagebrush, dryland grasses and rocky basalt rock outcroppings. A greater diversity of vegetation dominated by hardwoods and herbaceous vegetation occurs in the canyons drainages of Yakima Ridge such as Kittitas Canyon, Cold Creek, Hanson Creek, and Lower Crab Creek.

Most of the valleys are dominated by agricultural development in the form of orchards (e.g., apple, cherry, and pear), hop yards, vineyards, mint, corn, wheat, and other crops. A portion of the undeveloped arid steppe grasslands are used for grazing. Major and minor urbanized areas include Selah, Yakima, Moxee City, Desert Aire, and Mattawa. Smaller developed areas include Schwana, Beverly, and Wanapum Village. Much of the developed area is characterized by low density residential farmland or lots. Much of the Project area is also industrialized with hydroelectric dams, high voltage transmission line corridors, and associated infrastructure (e.g., Vantage Substation, Midway Substation, Pomona Heights Substation, Bonneville Power Administration (BPA) and Pacific Power transmission corridors). Major travel routes include Interstate 82 (I-82), U.S. Highway 12, and State Route (SR) 24, SR 243, and SR 821. The old C, M, SP, & P railroad corridor is located on the south and west side of the Columbia River adjacent to the JBLM YTC and across the north end of the Project area through Beverly. Views of the distant Cascade Mountains (i.e., Mt. Rainier and Mt. Adams) often occur from residences, recreation areas, and travel corridors.

The basalt cliffs along Yakima and Columbia River corridors, Umtanum Ridge and Saddle Mountains provide visual interest in the Project area. The riparian valleys of Cold Creek, Lower Crab Creek, and drainages/canyons dissecting the ridges and hills (e.g., Hanson Creek, Alkali Canyon, Corral Creek, and Sourdough Canyon) contain more landform and vegetation variety.

The open water areas of Priest Rapids Lake, Wanapum Lake and the Columbia River, coupled with the surrounding basalt cliffs such as in the Sentinal Gap and Sentinal Bluffs, Umtanum Ridge, and Saddle Mountain areas, provide the most visually diverse scenic landscapes in the Project area.

Scenic quality was identified in the 2010 VRI and data gaps were filled as part of the visual resources analysis for this EIS. Table 3.8-1 summarizes the SQRUs developed as part of the 2010 VRI. Rating units identified as part of this analysis are shown in Table 3.8-2.

A total of nine contiguous areas were identified in the Project analysis where scenic quality was not evaluated in natural settings for the 2010 VRI. These areas were assigned rating units, evaluated for similarity with the inventory units developed in the 2010 study, and assessed using Form 8400-1. All of these units were located on non-BLM lands. The scenic quality evaluation was applied to undeveloped, naturally appearing landscapes. In some instances, scenic quality was inferred from existing (VRI) inventory data and similar landscapes in the region due to remoteness and access difficulty. A summary of the SQRUs developed during the evaluation of the Vantage-Pomona Heights Transmission Line Project is shown in Table 3.8-2.

TABLE 3.8-1 SQRUs IDENTIFIED IN 2012 SPOKANE DISTRICT VRI STUDY

BLM SQRU ID NUMBER	DESCRIPTION	SQ RATING
022	Common landscape in region; some interesting features with several discordant elements; high level of agricultural development adds discordant elements to the landscape. The dominant landscape features in this unit are the Rattlesnake Hills and Yakima Ridge. It is characterized by undulating, rolling hills, with interesting erosional patterns and ephemeral drainages and draws. Colors tend to be muted, though with some contrast, and are likely more pronounced in growing seasons. Modifications include roads, fences, transmission lines, and agricultural fields in valley/low lying areas. Agricultural areas provide strong contrast with generally undeveloped higher elevation areas	C
024	Distinctive river canyon with many interesting features. Unit includes the distinctive Yakima River Canyon, which is characterized by prominent rock outcrops, formations, and boulder fields along with an interesting variety of vegetation. Scale of canyon provides a more intimate landscape experience (when compared to larger river canyons in region). Road, railroad, and developed recreation sites are the primary landscape modifications and are designed to fit the contours of the canyon, introducing slightly discordant elements at certain locations. Some residential/ranch and industrial facilities also add some discordant elements to the canyon. Tourism and recreation-related use is high given scenic quality and recreation opportunities in the canyon.	A
025	Common, with little vertical relief and interesting features. Unit includes the Wahluke Slope, the south facing aspect of the Saddle Mountains. The southern slope is characterized by low, rolling hills with periodic shallow to deeply cut ravines and drainages that add some texture to the landscape. Orchards and vineyards extend to the lower portion of the foothills. Transmission lines cross the ridge, and off-highway vehicle (OHV) and other road cuts are visible in several locations. While interesting as a large, relatively undeveloped ridgeline/slope against a largely agricultural backdrop, it is also common in the region and has few distinctive features.	C
026	Large, distinct river corridor, but with a high level of modification; Rating unit includes lands along the mid-Columbia River. The Columbia River dominates views from throughout the unit, though there are highly developed areas that introduce discordant elements to the landscape in multiple locations. Landforms include gently rolling hills to striking rock faces, bands, outcrops, and formations, as well as prominent vertical relief. Use in the river corridor is high given the importance of the Columbia River to commerce, travel, tourism, and recreation. Modifications include several dams, transmission lines, roads, rural development, and railroads, among other elements.	B
030	Interesting as a remnant of undeveloped land, but landform is common in region; interesting elements, some contrast, but in highly modified area and common to region. Unit includes BLM lands in the vicinity of Yakima, primarily on undeveloped to lightly developed ridges and slopes, which are interspersed with residential and agricultural development. Undeveloped areas contrast with the urban/suburban development and agricultural fields (orchards) in and around Yakima. Ridges and slopes contain many interesting features (rock outcrops and formations, edaphic plant communities), but tend to be common to the region and surrounded by highly modified landscapes.	C
064	Very prominent ridge line with interesting rock formations, outcrops, striations, and variability. Landscape is dominated by the north-facing slopes of the Saddle Mountains. Adjacent valley includes the Crab Creek Wildlife Area, portions of the Columbia National Wildlife Refuge, and the John Wayne Trail. The slopes of the Saddle Mountains contain multiple interesting features including rock outcrops, formations, striations, erosional plumes, and others. The adjacent wildlife areas create a distinct valley that contrasts and adds interest to the ridge/slopes. The slopes and valley have some discontinuous elements, though others appear harmonious. While prominent on the landscape, the slope and its interesting features are somewhat common in the region.	A

Source: BLM VRI 2010.

TABLE 3.8-2 PROPOSED PROJECT SQRUs IN PROJECT AREA

SQRU ID NUMBER	DESCRIPTION	SQ RATING [1]	IOP
01_22v	Extension of BLM Unit 22 occupying the area south of and along the southern border of JBLM YTC of the Yakima Ridge. Largely undeveloped, but some low density residential development and isolated communication structure installations and roads. Moderate to steeply sloping hillsides and ridges often exhibiting dark, sparsely vegetated volcanic domes of rock adding interest to the generally uniform slopes, but the landscape is common to the region and bordered on the south by agricultural or urban development.	C	A
02_24v	Extension of BLM Unit 24 along the Yakima River Valley through the city of Yakima, this unit is a riparian corridor with urban development occupying the border areas and parkland development interspersed within the unit. Open, flowing water and diversity in vegetation forms define the narrow, natural ribbon through the highly modified urban area. The developed parkland modifying the dominant natural riparian corridor only slightly detracts from the setting, but influence of the urbanized areas of adjacent scenery negatively influences the scenic quality of the unit.	B	B
03_30v	Extension of BLM Unit 30 in the north of Yakima, typically undeveloped, but includes some communication structures and roads. Adjacent to the Yakima River, the moderate to steeply sloping hillsides and ridge of the western-most section of the Yakima Ridge in the Project area contains rock outcrops and formations adding interest to the generally uniform slopes, but it is common to the region and surrounded by agricultural or urban development.	C	C
04_26v	Inferred from BLM VRI and similar regional landscapes (see Table 3.8-1, Unit 26)	B	None
05_26v	This unit includes flat, sagebrush dominated, undeveloped land in the context of highly modified agricultural and industrial landscapes along the Columbia River. The unit is bordered by a steep bench transitioning to the Waluke Slope to the north and by the Umtanum Ridge and Columbia River to the south. Cultural modifications a prevalent but not dominant, are not orderly or visually cohesive, and generally detract from the simple, natural, regionally common landscape.	C	D
06_25v	Inferred from BLM VRI and similar regional landscapes (see Table 3.8-1, Unit 25)	C	None
07_64v	Landscape is bounded by BLM Unit 64 and the Saddle Mountains to the south, and includes the Lower Crab Creek corridor. The variable vegetation forms and colors of the corridor coupled with the dramatic slopes of the Saddle Mountains provide visual interest. Cultural modifications, such as the transmission lines, radio towers, canals, roads and other engineered features somewhat detract from the dominant natural features provided by Nulley Lake/Lower Crab Creek Wildlife Area and the riparian corridor. The slopes of the adjacent mountain reinforce and contribute to the overall visual quality of the landscape.	C	E
08_26v	Inferred from BLM VRI and similar regional landscapes (see Table 3.8-1, Unit 26)	B	None
09_26v	Landscape is bounded by BLM Unit 64 and the Saddle Mountains to the south, and includes the Lower Crab Creek corridor. The variable vegetation forms and colors of the corridor coupled with the dramatic slopes of the Saddle Mountains provide visual interest. Cultural modifications, such as the transmission lines, radio towers, canals, roads and other engineered features somewhat detract from the dominant natural features provided by Nulley Lake/Lower Crab Creek Wildlife Area and the riparian corridor. The slopes of the adjacent mountain reinforce and contribute to the overall visual quality of the landscape.	B	F

[1] - See Appendix C - Visual Resources Supporting Data

Class A scenery is limited to the north side of the Saddle Mountains along the Sentinel Bluffs and in the Lower Crab Creek Valley. Class B scenery is generally associated with the Columbia River corridor, Priest Rapids Lake and Wanapum Lake area. Examples of Scenic Quality Rating Units are shown in Appendix C2 – Development Character and Scenic Quality Supporting Data.

Developed landscapes were not evaluated for scenic quality because scenic quality evaluations focus on natural landscape features which are often subordinate or absent from developed landscapes. In order to characterize heavily modified landscapes, "Development Character Areas" were identified. Development Character Areas were identified in landscapes dominated by cultural activities where the visual attributes of the native landscape is subordinate to the expressions of human dominated activities. Landform and vegetation patterns are so altered from the native landscape, that evaluation of scenic attributes as evaluated using Form 8400-1 (Scenic Quality Field Inventory) and Form 8500-5 (Scenic Quality Rating Summary) are not applicable. Instead, the dominating features of form, line, color and texture of the human dominated landscape is compared with the project activities to determine compatibility or contrast with the architectural or development patterns that exist in the developed landscape. Development Character Areas typically fall into land use/land cover categories with similar visual attributes, each with similar visual patterns (e.g., architectural form, building arraignment, visual density and complexity) that dominate or supplant the natural landscape. The general Development Character Areas identified for the Vantage-Pomona Heights Project fall into the following categories:

- Residential
- Developed Parkland
- Agricultural (irrigated agriculture, vineyards, hopyards, row crops)
- Industrial/Utility

As with scenic quality, compatibility with Development Character Areas is assessed separately from "visibility", and forms the baseline visual condition of the landscape independent from viewers. Examples of four Development Character Areas are shown in Appendix C2 – Development Character and Scenic Quality Supporting Data.

3.8.2.4 Sensitive Viewers and Viewpoints

Residential
All occupied residences were confirmed in the field within one-mile on either side of assumed route segment centerlines (the land use analysis area). Other residences were selectively confirmed based on potential visibility of the Project within the visual resources analysis area (three miles on either side of the assumed centerlines of route segments). Concentrations of residential development with potential visibility of the Project were documented. Dispersed residences occur throughout the visual analysis area. Viewing conditions were noted from representative locations of residential areas (see KOPs, Table 3.8-4). Refer to Appendix C-1 – Sensitive Viewpoints: Definitions, Criteria and Viewpoint Summary Table for a list of all sensitive viewpoint data.

Parks, Recreation and Special Management Area
See Section 3.5 for a detailed description of recreation areas and Section 3.6 for a detailed description of Special Management Areas (SMAs) within one mile either side of route segment centerlines. These and other parks, recreation and special management areas not identified in Sections 3.5 or 3.6 (greater than two miles from the assumed route segment centerlines) with potential views of the Project are summarized below. Refer to Table 3.8-3 for a summary of sensitive viewers and Appendix C-1 for detailed data on sensitive viewers in the Project area.

Federal
Areas with potential visibility of the Project include:

- <u>Columbia National Wildlife Refuge</u> (NWR) – Public access to the refuge is very restricted in the Project area. Its' steep topography and lack of access limit potential visual sensitivity to the scenic attributes of the area. Located on the north side of the Saddle Mountains and along Lower Crab Creek, scenic quality is high (Class A).

- Columbia River (and eligible Wild and Scenic River segment) – The Columbia River from one mile downstream of Priest Rapids Dam to through the Hanford Reach National Monument is accessed by the public from boat launches to the east of the Project area (e.g., Vernita Bridge Fishing Access Site). This stretch of the river is used primarily for fishing.
- Hanford Reach National Monument (HRNM) – Access to the HRNM is restricted in the Project area. The USFWS portion of the monument is the only area open to the public. However, there are no dedicated facilities.
- Sentinel Slope ACEC and McCoy Canyon ACEC – These ACECs are designated for Federal Candidate plant species. There is no public access or recreational aspects to these areas, and therefore there would be no views of the Project from these areas. Located on the cliffs of the Columbia River (McCoy Canyon) and Saddle Mountains (Sentinel Slope), however, scenic quality is generally moderate to high (Class B and A, respectively).
- Saddle Mountains Management Area – This BLM-administered area provides OHV riding in the open area, petrified wood collection, horseback riding, hunting, and other recreational opportunities. These activities are generally dispersed across western and eastern portions of the Saddle Mountains, with OHV riding being the dominant recreational activities on the west end. Numerous trails traverse the area, and informational signing is located at the R Road access point. Access to the area is provided primarily by the R Road extension (see Saddle Mountain Recreation Access Route below).

State
State managed parks, recreation and special management areas are detailed in Sections 3.5 and 3.6. Areas with potential visibility of the Project include:

- John Wayne Pioneer Trail (Iron Horse State Park) – Administered by the Washington State Parks and Recreation Commission as part of the Iron Horse State Park, users of the trail traverse the Project area along the Milwaukee Road Corridor, across the Beverly Bridge, and through the JBLM YTC. A variety of non-motorized activities from horseback riding to snowshoeing are allowed on the trail. Access to the trail is by permit only, with trailheads near Nunnally Lake off Crab Creek Road and southwest of Wanapum Dam on Huntzinger Road.
- Nunnally Lake-Lower Crab Creek Wildlife Area – Used primarily for fishing, public access to the site is provided by a parking lot located east of Beverly on Crab Creek Road.
- Columbia Basin Wildlife Area - Priest Rapids and Lower Crab Creek Units.

Yakima County
Yakima County facilities in the Project area include the Yakima Loop Trail (and Greenway). The Yakima River Greenway is proposed to be extended to the north through Selah Gap and the Yakima Elks Golf and Country Club.

The Yakima Elks Golf and Country Club is a private course located on the west side of the Yakima River northeast of Selah.

Benton County
There are no Benton County recreation sites in the Project area.

Kittitas County
There are no Kittitas County recreation sites in the Project area.

Grant County/Grant County Public Utility District (Grant County PUD)

Burkett Lake / Crab Creek Corridor Recreation Area (Grant County PUD)

The Burkett Lake/Crab Creek Corridor Recreation Area is located on Crab Creek Road approximately 0.5 mile east of Beverly. Currently, a day use area with picnic tables and an informational kiosk is located on the northwest side of the park, and a gated access road which allows for lake access is located on the east side. Existing uses of the area also include dispersed, non-motorized activities such as hiking, hunting, fishing, scenery viewing, and wildlife/botanical watching. See Section 3.5-Recreation for a detailed description of the site.

Priest Rapids Lake

Priest Rapids Lake is typically used for fishing, boating and sightseeing. See Section 3.5-Recreation for a detailed description.

Priest Rapids Recreational Trail (Grant County PUD)

Priest Rapids Recreational Trail is a Grant County PUD administered undeveloped trail located along the east side of Priest Rapids Lake adjacent to the Desert Aire community. Currently, a day use access site is located at the south end of Road U SW and the Desert Aire Dock is located south of the community. The trail generally follows the shoreline between Desert Aire Dock and the Grant County PUD Day Use Area.

Wanapum Heritage Center/Picnic Area (Grant County PUD)

The Heritage Center is located next to Wanapum Dam on the Columbia River west of SR 243. The Wanapum Heritage Center's activities focused towards interior displays and activities, but there an outdoor picnic area located just south of the facility containing picnic tables and parking.

Wanapum Dam Overlook (Grant County PUD)

Wanapum Dam Overlook is located just east of SR 243 northeast of Wanapum Dam. The overlook is currently unmarked from SR 243, and provides views to Wanapum Lake and the Columbia River corridor.

Wanapum Lake

Dispersed views also occur from Wanapum Lake. Access to the lake near the Project area is from the Upper Wanapum Dam Boat Launch and Getty's Cove Boat launch located on the south end of the lake off of Huntzinger Road south of Wanapum State Park. As with Priest Rapids Lake, recreational activities include fishing, boating and sightseeing. The Upper Wanapum Dam Boat Launch (Grant County PUD) is located on the east side of the lake west of SR 243. Future plans include the installation of an Americans with Disabilities Act (ADA) (accessible) float at the site, surface improvements to the parking area, and the construction of toilet facilities.

Yakima City

Yakima City Parks and recreation site within the three mile study corridor are associated with the Yakima Greenway. The 16th Avenue Parking Lot, Harlan Landing Boat Launch and picnic area, and Rotary Lake fishing, parking and picnic area all occur along the Yakima River Greenway.

Travel Corridors

Federal

I-82 runs along the extreme western boundary of the Project. Views of the Project would potentially be from the east-bound lane, though west bound traffic would potentially view the Project in the vicinity of the Pomona Heights Substation very briefly.

The western portion of the Saddle Mountains MA is accessed via the R Road extension (Saddle Mountains Access Route) located on the southern side of the Saddle Mountains in Grant County. This road is located on BLM, Reclamation and private lands, and is located just east of Mattawa.

State

Yakima River Canyon Scenic Byway is a Washington State Scenic Byway (WSDOT Tourism Route) following the Yakima River along SR 821 from its intersection with I-82. The byway would potentially have background views of the Project in a setting that is largely screened by development, topography and/or vegetation.

SR 24 is located primarily in Yakima County along the south end of the Project between Yakima Ridge and the Rattlesnake Hills. The highway connects Moxee and Yakima on the west with the HRNM area on the east in the Project area. Both east and west bound travelers would potentially view the Project to the north.

SR 243 is located in Grant County, and connects Hanford National Monument on the east with Desert Aire, Beverly and Wanapum Dam on the north in the Project area. Travelers would have immediate foreground views of the Project from this highway.

County/Local

Travelers on many local roads would potentially have views of Project alternatives in the Project area. In Yakima County, travelers using E. Selah Road near the Pomona Heights Substation would potentially view the Project. Travelers using collector and minor roads would potentially view the Project along Sage Trail Road, Postama Road, Coombs Road, Mieras Road, Beane Road, and N. St. Hilaire Road. Other local roads such as Stateland Road, Spring View Drive, Bohokey Drive, and Chapman Road were not included in the sensitivity analysis because these roads are very lightly used, service only a few residences, and are not identified as significant roads either by the county or WSDOT.

In Grant County, travelers using the following local and collector roads would potentially view the Project along O Road, N Road, Road 24 SW, Road 27 SW, Lower Crab Creek Road, and Beverly Berke Road. Other local roads such as N Road, Road 27 SW, and Road 23 SW were not included in the sensitivity analysis because these roads are very lightly used, service only a few residences, and are not identified as significant roads either by the county or WSDOT. R Road Southwest serves as the primary access road to the BLM administered Saddle Mountains Management Area.

In Kittitas County, travelers using Huntzinger Road would potentially view the Project.

Key Observation Points

Visual sensitivity of all residences, parks and recreation areas, and travel corridors are summarized below in Table 3.8-4 and detailed in Appendix C-1: Sensitive Viewpoints: Definitions, Criteria and Viewpoint Summary Table. Appendix A-Visual Resources map illustrates visual sensitivity, KOP locations, IOP locations, scenic quality and Development Character Areas for the Project area.

Based on the identification of potentially sensitive viewpoints and the sensitivity analysis, KOPs were identified based on representative views from highly or moderately sensitive viewing locations, such residential concentrations, roadways, or important recreation area. A total of 16 KOPs were selected that represent typical views from sensitive areas in the Project area. These KOPs were used for contrast analysis and for the identification of potential photo simulations. A total of three were selected for the development of visual simulations (see Appendix C-4). The KOPs identified for the Project are summarized in Table 3.8-4 below.

TABLE 3.8-3 SENSITIVE VIEWPOINTS IDENTIFIED IN PROJECT AREA

VIEWPOINT	SENSITIVITY
Beverly Sand Dunes OHV Park	M
Buckshot Boat Launch	M
Burkett Lake Recreation Area/Crab Creek Corridor	H
Columbia Basin Wildlife Area-Lower Crab Creek Unit/Nunnally Lake	H
Columbia Basin Wildlife Area-Priest Rapids Unit	M
Columbia NWR	M
Columbia River Corridor (Eligible Wild and Scenic River)	M
Desert Air Dock	M
Desert Air Golf Course	M
Desert Aire Boat Launch/Recreation Area	M
Getty's Cove Day Use and Boat Launch	M
Hanford Reach National Monument/Saddle Mountain NWR	M
Huntzinger Rd. Boat Launch	M
Interstate 82	L
John Wayne Pioneer Trail/Milwaukee Corridor/Beverly Railroad Bridge National Register of Historic Places (NRHP) Site	H
Lower Wanapum Dam Boat Launch and Picnic Area	M
Priest Rapids Lake	M
Priest Rapids Recreational Trail	H
Residences - All Occupied	H
Roads - Collector Rural Roads (Huntzinger Rd. E. Selah Rd., Postama Rd., Beane Rd., Coombs Rd., Mieras Rd., O Rd., 24 SW, 28 SW, Lower Crab Creek Rd., Beverly Berke Rd., Huntzinger Rd.)	M
Roads - Other Local Roads (Sage Trail Road, N. St Hilaire Rd.)	M
Saddle Mountain Hang Gliding Launch Area	H
Saddle Mountain Recreation Access Route (R Rd Extension)	H/M
Saddle Mountains Management Area	H/M
Sand Hollow South Boat Launch	M
SR 24	M
SR 243	M
Upper Wanapum Dam Boat Launch	M
Vernita Bridge Fishing Area and Boat Launch	M
Vernita Bridge Rest Stop	M
Wanapum Dam Overlook	M
Wanapum State Park/Boat Launch	H
Wanapum Heritage Center Picnic Area	M
Wanapum Lake	M
Yakima Elks Golf & Country Club	M
Yakima River Canyon Washington Tourism Route (SR 821)	H
Yakima Greenway Trail-Yakima River	H

Key:
H=High
M=Moderate
L=Low

TABLE 3.8-4 KEY OBSERVATION POINT SUMMARY

KOP NAME	LOCATION	VISUAL SENSITIVITY (LAND USE TYPE)	ZONE/SEGMENT
KOP 1 - Sage Trail Road	Sage Trail Road north of Koch Rd	High (Residential)	Z1/1a
KOP 2 - N. Hilaire Rd.	N. Hilaire Rd/Tester Ln Intersection	High (Residential)	Z1/ 1b&1c
KOP 3 - Mieras Rd	Mieras Rd West of Prairie Rd	High (Residential)	Z1/ 1c
KOP 4 - SR 24 EB	East-bound SR 24 1.5 mile west of Meeboer Ranch	Moderate (Travel)	Z2/2c
KOP 5 - SR 243	SR 243 just west of Road O SW	Moderate (Travel)	Z3/3c
KOP 6 - 24 SW Rd	24 SW Rd 0.2 mile west of Road O SW	Moderate (Travel)	Z3/3c
KOP 7 - Saddle Mt OHV Access Route (R Road SW)	OHV Area of Saddle Mountains c. 3.3 miles past BLM Gate on R Road SW	Moderate (Recreation)	Z3/3c
KOP 8- Burkett Lake Recreation Area	Burkett Lake Day Use Area	High (Recreational)	Z3/3c
KOP 9 - Milwaukee Road Corridor	Near Nulley Lake Parking Lot/Trailhead East of Beverly	High (Recreational)	Z3/3c
KOP 10 - Beverly	East Side of Beverly north of Pasco St-1st Ave. Intersection	High (Residential)	Z3/3c
KOP 11 - Wanapum Village	West Side of Wanapum	High (Residential)	Z3/3b
KOP 12 - John Wayne-Iron Horse Trailhead	Southwest of Wanapum Dam at Parking Lot/Trailhead	High (Recreational)	Z3/3b
KOP 13 - Desert Aire Residential	Along the Lake in Desert Aire	High (Residential)	Z3/3b

3.8.2.5 Distance Zones

Distance zones were established based upon perception thresholds, the scale and nature of the objects being viewed, and the viewing environment. The perception of form, texture, color and other visual elements in the landscape is a function of changing distance from a viewpoint. In general, landscape elements tend to become less obvious and detailed at greater distances. Elements of form and line become more dominant than color or texture at longer viewing distances. The U.S. Forest Service and BLM have defined distance zones (identified in their visual management systems) for the primary purpose of establishing management classes.

The BLM has utilizes distance thresholds as identified in the VRM methodology. These Distance Zones are as follows:

> *Foreground* – The limit of a viewed area in which details are perceived and obvious. Textural and other aesthetic qualities of vegetation are normally perceived within this zone (0 to 0.25 - 0.5 mile).
>
> *Middleground* – The zone in which details of foliage and fine textures cease to be perceptible. Vegetative patterns begin to appear as outlines or patterns (0.25 - 0.5 to 3 - 5 miles).
>
> *Background* – That portion of the landscape where texture and color are weak and landforms become the most dominant element (3 - 5 to 15 miles).
>
> *Seldom Seen* – Those areas of the landscape where topographic relief or vegetation screen viewpoints or when viewing distances are beyond 15 miles.

For this project, a review of the Project region and previous studies in similar geographical, topographical, and environmental settings was performed (Jones and Jones 1976), and relevant visibility thresholds have been established based on previous experience conducting similar visual studies. As a result of studies conducted on transmission line visibility in the northwestern United States, visibility threshold trends were uncovered that correlated to tower type, corridor variables, and landscape settings. Visibility is dependent on the height and structure types of the typical transmission line with respect to the surrounding landscape. Distance zones were used to asses Project impacts on viewers (in conjunction with Contrast Rating Forms) and to quantify high-moderate-low impact miles on viewers for each alternative. For the typical 65 to 95 foot high H-frame or monopole structures, distance zones identified for this Project are as follows:

Immediate Foreground: Viewpoint location to 1,000 feet – This very high visibility distance zone is where the Project (primarily, the 65 to 95+ foot H-frame and monopole transmission structures) would be dominant and where high and moderate sensitivity viewers would likely be significantly impacted.

Foreground: 1,000-feet to 0.33 mile - This high visibility distance zone is where the Project would potentially be dominant depending on the viewing conditions and where high and moderate sensitivity viewers could be significantly impacted.

Middleground: 0.33 mile to 1-mile – This is the distance zone where the potential Project impacts on high sensitivity viewers begins to diminish and the Project will become co-dominant or sub-dominant in the landscape, depending on the viewing conditions and setting.

Background: 1-miles to 2-miles – This is the distance zone where the Project is likely not likely be perceived by the moderately sensitive casual viewer, and where high sensitivity viewers would impacted only where the strongest contrasts would occur, such as in skylining conditions where no transmission lines currently exist.

Seldom Seen: Beyond 2-miles – Beyond two miles, typical Project elements would not be noticeable to viewers even where strong contrasts occur and typically would not be seen due to intervening vegetation, topography, atmospheric conditions or other factors.

Note that these distance zones apply only to alternative route segments, and not to the (200+ feet high) Columbia River crossing towers. For the Columbia River crossing structures, the distance zones are as follows:

Immediate Foreground: Viewpoint location to 0.75 mile

Foreground: 0.75 mile to 1.5 miles

Middleground: 1.5 miles to 3.0 miles

Background: 3.0 miles to 4.0 miles

Seldom Seen: Beyond 4.0 miles

3.8.3 Current Management Considerations

3.8.3.1 Federal

BLM

The BLM Spokane District currently manages lands under its jurisdiction in the proposed Project area in accordance with the Spokane District RMP (1985) and ROD (1987) and the 1992 RMP Amendment and ROD (Spokane District 1985/1987 RMP and 1992 RMP Amendment/ROD) (BLM 1992). The Spokane District has begun the process of revising the RMP (BLM 2011). VRM were not updated in the 1987 RMP from the previous 1980-1982 Management Framework Plan, and a significant portion of the data has been lost, including the VRM Classes in the proposed Project area. Appendix D of the RMP details District special stipulations applicable to the Project and identifies specific areas of VRM Class

Management (Yakima River Canyon: Class 2; Badger Slope: Class 2), which are outside of the Project area. The Spokane District RMP (1985) and ROD (1987) and the 1992 RMP Amendment and ROD (Spokane District 1985/1987 RMP and 1992 RMP Amendment/ROD) also states that:

> "Recreational activities and visual resources will be evaluated as part of the specific activity plans and will be evaluated to determine their appropriateness in relation to the land use allocations made by the Resource Management Plan"; and

> "The evaluation of visual resources will consider the significance of proposed projects and the visual/scenic sensitivity of the affected area. Stipulations will be attached as appropriate to assure compatibility of projects with management objectives for visual resources."

In preparation for the plan update, a VRI was conducted during 2010, and VRI Classes were established. VRI Classes, however, only establish baseline visual resource values. The inventory classes represent the relative value of visual resources, and provide the basis for considering visual values in the RMP planning process. VRM Classes are established though the RMP process, which may or may not reflect the VRI. Resource allocations decisions made in the RMP will determine final VRM Classes.

Interim VRI Classes were developed by the BLM based on the VRI and desired management direction pending the development of the forthcoming revised RMP. The Interim VRM Classes were established in the Project area in accordance with BLM Memo 285003-OR W020. The Interim VRM Classes established by the BLM (Interim Class III) in the Project area are shown in Appendix A: Visual Resources Map.

3.8.3.2 State

There are no formal guidelines or standards regarding visual resource management in Washington State.

3.8.3.3 Yakima County

The Yakima County Comprehensive Plan (Yakima County 2007) was adopted May 20, 1997 and the Washington State Growth Management Act (GMA) Update included in 2007. The visual Natural Setting is covered under section NS 6. Section NS 6 has goals and policies related to the protection of visual resources in Yakima County. Those goals and policies pertinent to the Project are as follows:

Goal NS 6: *Protect property values by improving the appearance of Yakima Valley.*

- *Policies:*
  - *NS 6.1 Protect the natural, historic, and visual quality of remote areas.*

Visual resources are also covered in the Shorelines Environments Section (Public Access – Physical and Visual subsection). Pertinent Policies include:

- *NS 7.39 Development standards should be established to assure preservation of unique, fragile, and scenic elements and to protect existing views from public property or large numbers of residences. Where aesthetic impacts are not avoidable, provide mitigation.*
- *NS 7.41 Proper design, location, and construction of road and railroad facilities should be exercised to provide to the degree practical, scenic corridors, rest areas, view points, and other public oriented facilities in public shoreline areas.*

- *NS 7.42 Wherever feasible, utility facilities should be placed underground.*

3.8.3.4 Benton County

Benton County Comprehensive Land Use Plan 2006 Update identifies Goals, Policies and Actions that are primary directives for land use decision making and long range planning. There are no Goals or Policies related to visual resources that are pertinent to the Project.

3.8.3.5 Kittitas County

Visual resource goals and objectives pertinent to the Project were identified in the Kittitas County Comprehensive Plan (Kittitas County 2010) as follows:

> Shoreline Use Activity
> ***GPO 2.53:*** *Utilities; Utilities should be designed and installed in a manner which would result in minimal damage to the normal qualities of the shoreline area.*
>
> *Utilities should be planned to avoid destroying scenic views.*

3.8.3.6 Grant County Public Utilities District

The Grant County PUD is currently managing Project lands under the policies and procedures of the Shoreline Management Plan (SMP) (see Section 3.4 Land Use). The 2010 Final SMP submitted to Federal Energy Regulatory Commission (FERC) in March of 2010, identifies goals for scenic and aesthetic resource protection.

> *3.6 Goal 6: Protect Scenic Quality and Aesthetic Resources*
> *The following objectives describe the commitment by Grant County PUD to protect the scenic quality of the river and its surrounding landscape.*

- *Preserve the natural aesthetic qualities of the Project lands and waters through successful implementation of the SMP. This is achieved primarily through Land Classifications (see Land Use and Recreation Sections 3.4 and 3.5).*
- *Coordinate with property owners and resource managers within and adjacent to the Project Boundary to promote protection and enhancement of scenic quality and aesthetic resources.*
- *Ensure resource management and monitoring measures are successfully implemented.*

Resources Management classification will be managed to preserve and enhance conservation and protection of fish, wildlife scenic, historic, archeological, and cultural resources.

3.8.3.7 Grant County

The Grant County Comprehensive Plan (1999) identifies Goals and Policies to guide development activities within unincorporated Grant County. The following Goals and Policies regarding visual resource management that are pertinent to the Project include:

> ***Goal NS-9:*** *The County should recognize and protect the functions of the shoreline environments of statewide and local significance. For shorelines of state-wide significance, protection and priorities are to:*
>
> *b. Preserve the natural character of the shoreline;*

- *Policies*
- *NS-9.4 Conservation*
  2. Reclaim and restore areas that are biologically and aesthetically degraded to the greatest extent feasible.
  3. Preserve scenic vistas, aesthetics, and vital estuarine areas for fisheries and wildlife protection.

- *NS-9.9 Utilities*
  3. Design utility facilities and ROWs to preserve the natural landscape and to minimize conflicts with present and planned land uses.
  6. Locate and design facilities in a manner that preserves the natural landscape and shoreline ecology, and minimizes conflicts with present and planned land uses.

3.8.4 Route Segment or Zone-Specific Considerations

3.8.4.1 Zone 1

Route Segment 1a (Agency Preferred Alternative)
The landscape character along this route segment is low density residential, with adjacent undeveloped lands being Scenic Quality Class C. Route Segment 1a is in the immediate foreground of high sensitivity residential viewers located primarily along Sage Trail Road, including the County Squire Mobile Manor community and adjacent streets. Views to the urbanized Selah Valley and Mt. Rainier occur from most of the residences located along Sage Trail Road (See KOP 1). The route would potentially be viewed from the moderately sensitive East Selah Road and I-82.

Other existing development along this route includes a 230 kV wood single pole and H-frame transmission line crossing Sage Trail Road and various electrical distribution lines as well as various gravel roads and driveways.

Route Segment 1b (Agency Preferred Alternative)
Route Segment 1b is located in the JBLM YTC along a primarily undeveloped Class C Scenic Quality landscape of low growing sagebrush and grassland. Scattered adjacent residential development occurs near to the route on its north end, and graded dirt or gravels road are prevalent, especially the fire break road along the JBLM YTC border. Residential development is concentrated more heavily on the south end of this route, and those located along St. Hilaire Rd. and Vissel Rd. would potentially have the Project in middleground view against the Yakima Ridge (see KOP 2).

Other residences on the south along Mieras Road and Coombs Road are within the foreground and middleground distance zone from the Project, with the Project crossing in a rolling, undeveloped sagebrush-steppe in front of the Yakima Ridge, Class C Scenic Quality landscape.

There is no existing transmission or other significant developed vertical features along this route.

Route Segment 1c
Visual resources along Route Segment 1c are nearly identical to Route Segment 1b, with the route being located outside the JBLM YTC boundary, parallel, and slightly closer (500 feet) to potentially sensitive viewers than Route Segment 1b north of E. Norman Road, although generally in also the middleground.

Route Segment 1b is located in JBLM YTC along a primarily undeveloped Class C Scenic Quality landscape of low growing sagebrush and grassland. Scattered adjacent residential development occurs adjacent to the route, and graded dirt or gravels road are prevalent, especially the fire break road along the

JBLM YTC border. Residences located along St. Hilaire Rd. and Vissel Rd. would potentially have the Project in middleground view against the Yakima Ridge (see KOP 2).

Other residences on the south end of the route segment along Mieras Road and Coombs Road are within the immediate foreground and foreground distance zone from the Project in a more developed residential and agricultural landscape (see KOP 3). Some residences in this area have views of Mt. Adams and across Moxee Valley to the southwest.

There is no existing transmission or other significant developed vertical features along this route.

3.8.4.2 Zone 2

Route Segment 2a (Agency Preferred Alternative)
Route Segment 2a also crosses an undeveloped Class C Scenic Quality landscape. Residential viewers located on Deeringhoff Road and Postma Road would potentially see the Project on the middleground or background distance zone.

Route Segment 2b
Route Segment 2b crosses Class C Scenic Quality landscapes south of the JBLM YTC primarily in an undeveloped landscape. The route would typically be in the background distance zone from several residences and or in the seldom seen distance zone for moderate sensitivity travelers using SR 24. BLM Interim VRM Classes crossed along this route are Class III.

Route Segment 2c (Agency Preferred Alternative)
Route Segment 2c also crosses Class C Scenic Quality landscapes as well as agricultural development character areas. This route is located primarily in the middleground distance zone from residences located north of SR 24, but would also be in the foreground view for at least one residence. The route would also parallel existing transmission line infrastructure along a majority of the route and in areas of foreground visibility. Viewers travelling along SR 24 would potentially view the Project in the middleground distance zone where the line parallels the 115 kV BPA and PacifiCorp 230 kV transmission lines, and in the middleground or background where the Project crosses undeveloped or agricultural landscapes. The route would also cross a short segment of Class III Interim VRM across BLM lands.

Route Segment 2d (Agency Preferred Alternative)
Route Segment 2d crosses undeveloped Class B and Class C landscapes along Cold Creek, Yakima Ridge and Umtanum Ridge. The closest potential sensitive viewers are located on the north and the south end of the route. The Project would potentially be viewed in the middleground viewing condition from SR 24 travelers on the south end of the route. On the north end of the route, dispersed Columbia River users would view the route in the immediate foreground and foreground distance zone. Also, SR 243 travelers would potentially view the Project in the background distance zone. The route would also cross a short segment of Class III Interim VRM across BLM lands.

3.8.4.3 Zone 3

Route Segment 3a (Agency Preferred Alternative)
Route Segment 3a is a very short segment located in the context of the existing Vantage Substation with associated dominant Industrial/Utility Development Character Area. Beverly-Burke Road travelers and nearby residences would potentially view the Project in the middleground distance zone.

Route Segment 3b
This route crosses the Columbia River just south of the Wanapum Dam in an Industrial/Utility Development Character Area adjacent to four other transmission lines of various voltages (230 kV to 500

kV). The route also follows Huntington Road and the abandoned C, M, SP, & P railroad on the west side of the Columbia River in agricultural and undeveloped Class B Scenic Quality landscapes. Sensitive viewers associated with this route include recreationists using the John Wayne Pioneer Trail and associated facilities who would view the Project in the immediate foreground, as well as Huntzinger Road travelers and residences associated with Wanapum Village (see KOP 11), the Auvil Fruit Company, and Desert Aire community located on the east side of the river. The Auvil residential area would view the Project in the immediate foreground distance zone. The route would also be potentially viewed in the background by recreationists using the Huntzinger Boat Launch, Priest Rapids Recreation Trail, Desert Air Dock, Priest Rapids Dock and dispersed users of Priest Rapids Lake-Columbia River. South of the Priest Rapids Dam, residences in the Priest Rapids community would also view the Project in the immediate foreground. Travelers using SR 243 would also potentially view the Project in the background distance zone. The route would also cross a short segment of Class III Interim VRM across BLM lands adjacent to the John Wayne Pioneer Trail.

Route Segment 3c (Agency Preferred Alternative)
Route Segment 3c would cross Class C and Class B scenic quality landscape and landscapes dominated by agricultural development. Class C landscapes are located in and around the Saddle Mountains area, and Class B scenic quality landscapes are located on the north side of the Saddle Mountains and along the Lower Crab Creek corridor. Agricultural Development Character areas are associated primarily with the Wahluke Slope area of Grant County. Residential Development Character Areas are crossed northeast of Beverly and in isolated areas of the Wahluke Slope. Existing utility development occurs near the Columbia River crossing, in the Saddle Mountain Management Area, and north of Beverly. Immediate foreground views would potentially occur from Columbia River corridor users; SR 243 travelers (see KOP 5); several residences located in the Wahluke Slope area and north of Beverly; Road 24 SW and Road O NW travelers (see KOP 6); Saddle Mountains MA and Access route users (see KOP 7); the private Saddle Mountain hang-gliding launch site; Beverly Sand Dunes Recreation Area; and the Milwaukee Trail/Crab Creek Road corridor (see KOP 9). Other foreground or middleground potential views occur from the Burkett Lake-Crab Creek Corridor recreation area (see KOP 8); Wanapum Village; Beverly (see KOP 10); and Nunnally Lake Fishing Area. The route would also cross a short segment of Class III Interim VRM across BLM lands in the Saddle Mountains.

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3.9 SOCIOECONOMICS

3.9.1 Data Sources

The socioeconomic analysis relies primarily on standard secondary data sources such as census data from the U.S. Bureau of the Census (primarily from decennial censuses covering population, income, and housing characteristics), employment and income data from the U.S. Bureau of Economic Analysis and U.S. Department of Labor, and state-level data from the Washington Office of Financial Management (OFM) and Washington Department of Employment Security (WDES). Data from local counties (county budgets) and cities were frequently used. Personal contacts were also made, particularly for information on tax revenues and transient housing.

3.9.2 Current Conditions and Trends, Regional Overview (Analysis Area)

The Study Region

The *Study Region* and *Local Area* for this analysis are defined based on the geographic extent of potential alternative route impacts. The impacts of the alternative routes would arise from employment and income generated by their construction and operation. In response to job opportunities, workers would be hired (1) from the local labor force, who would commute to the site or to local businesses that increase hiring due to the proposed Project, and (2) from areas outside the local labor market area, who would relocate to the area either long-term or for only the term of their employment on the Project (likely occupying transient housing such as hotel/motels and RV parks). Populations would increase due to this in-migration, as would demand for housing and public services. Tax revenues would accrue to local taxing jurisdictions, such as counties.

The alternative routes are located in four counties: Yakima, Kittitas, Grant, and Benton. Impacts of the alternatives in Benton County would be negligible because only a maximum of about four miles of Route Segment 3c would be located in the remote far northwest portion of the County, about 40 miles distant from any Benton County communities; thus, Benton County is not included in the *Study Region* (although potential property tax revenues to Benton County are described and the Environmental Justice evaluation includes a portion of Benton County). Figure 3.9-1 depicts the Study Region, including its primary communities.

Socioeconomic data, such as from the U.S. Department of Commerce (Bureau of the Census and Regional Economic Information System), WDES, and Washington OFM are often tabulated at the county level, making the county level of analysis convenient for most statistical tabulations. Thus, the Study Region is defined as Yakima, Kittitas, and Grant counties. The county seats of the three counties could experience some impacts, and thus Ephrata (Grant County), Yakima (Yakima County), and Ellensburg (Kittitas County) are at times included.

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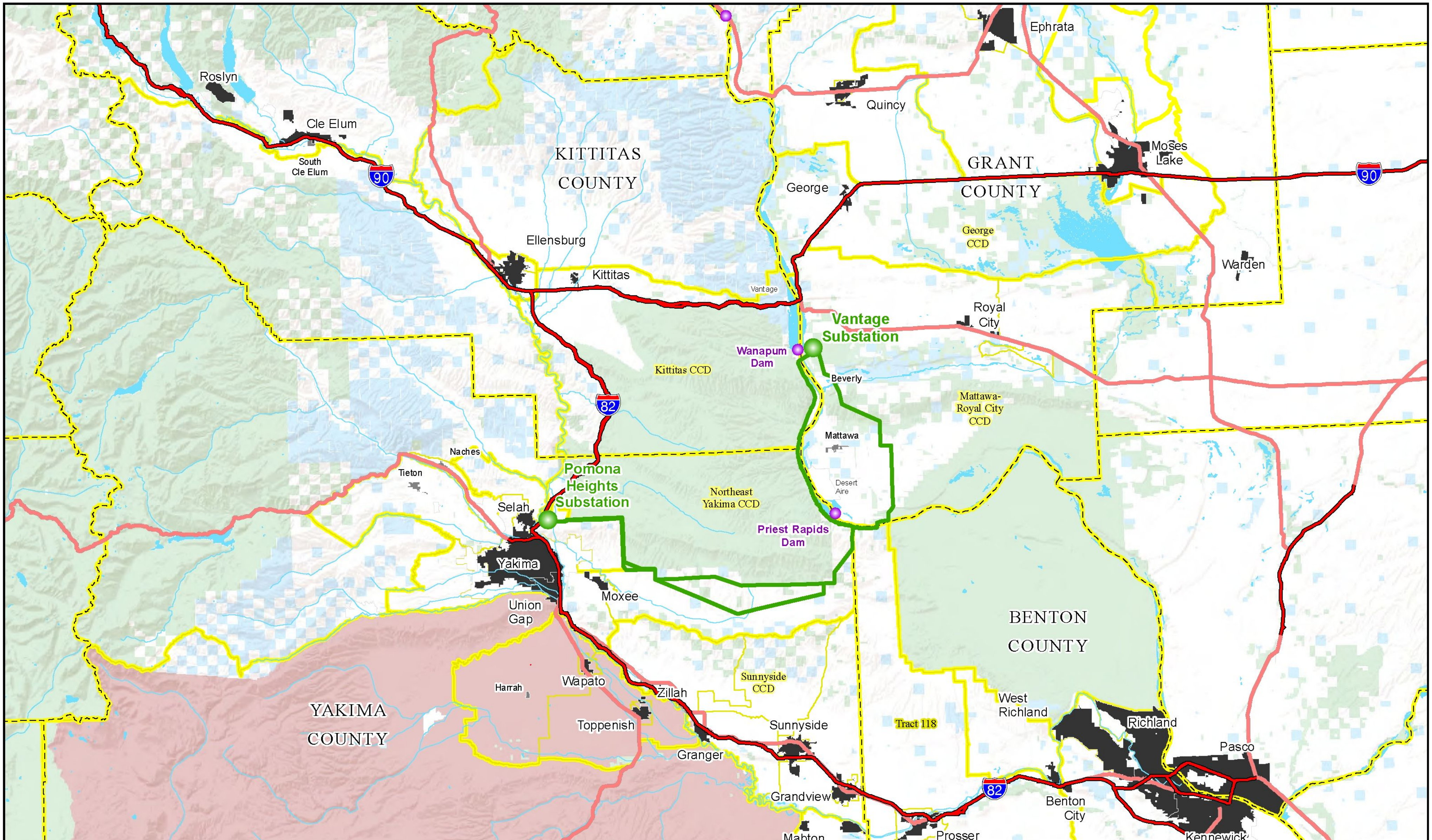

Vantage - Pomona Heights 230kV Transmission Line Project

Figure 3.9-1

Socioeconomics Study Region

Project Components
- Alternative Route
- Project Substation

Transportation
- Interstate Highway
- US or State Highway

Boundaries
- County Boundary
- Census County Division
- Census Tract
- City
- Town
- Census Designated Place

Land Ownership
- Federal
- State
- Bureau of Indian Affairs

Water
- Dam
- River or Stream
- Water Body

0 5 10 15 20 25
Miles
1 inch = 13 miles

PACIFIC POWER A DIVISION OF PACIFICORP
POWER ENGINEERS

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The Local Area is defined to better reflect the fact that much of the area in the Study Region will not be appreciably affected due to distance from the Alternative Routes. Communities that could experience the most noticeable temporary or long-term population increases will be those nearest the Alternative Routes in which housing for in-migrating workers is expected to be available. These include the Census County Divisions (CCDs) of: Sunnyside and Northeast Yakima County (Yakima County), Grant and Mattawa-Royal City (Grant County), and Kittitas (Kittitas County). In these CCDs are the incorporated communities of Moxee, in Yakima County, and George and Mattawa in Grant County; and unincorporated communities such as Vantage in Kittitas County, and Beverly and Desert Aire in Grant County.

3.9.2.1 Population

The three-county Study Region is relatively rural, with an average population density of 40.6 persons per square mile, compared to a statewide average of 101.7. Much of the Study Region lands are unoccupied and reserved for federal government use, such as the Joint Base Lewis-McChord Yakima Training Center (JBLM YTC).

The three primary cities in the Study Region are Yakima, Ellensburg (Kittitas County), and Moses Lake (Grant County). Each city is the county seat of its respective county. Of the three major cities, Yakima is closest to the Zone 1 and Zone 2 route segments, and Ellensburg is closest to the Zone 3 route segments.

The population of the three-county Study Region has increased steadily over the past two decades, from 270,346 in 1990, to 376,100 in 2011. This represented a 1.4 percent average annual growth rate, slightly below the statewide average of 1.6 percent. Population data are shown in Table 3.9-1.

Population is extremely sparse in the vicinity of the alternative routes. The three CCDs traversed by any of the alternative routes had a combined population of only 28,231 persons in 2010. The alternative routes are not located in close proximity to populated areas, except at the western end, where they connect with the Pomona Heights Substation (Figure 3.9-1). The nearest communities to any alternative route are: Unincorporated Vantage (2011 population of 74) in Kittitas County; the small settlement of Beverly (Beverly is not defined as a Census area, but about 50 residences are located there), unincorporated Desert Aire (2011 population of 970), and the town of Mattawa (2011 population of 4,460) in Grant County; and, the municipalities of Moxee (2011 population of 3,415), Yakima (2011 population of 91,630,) Union Gap (2011 population of 6,055), and Selah (2011 population of 7,205) in Yakima County.

TABLE 3.9-1 HISTORICAL POPULATION IN STUDY REGION, 1990-2011

JURISDICTION	CENSUS 1990	CENSUS 2000	CENSUS 2010	CENSUS 2011	LAND AREA (SQ. MILES)	POPULATION DENSITY 2011 (PERSONS PER SQ. MILE)	AVERAGE ANNUAL GROWTH RATE, 2000-2010
Grant County	**54,798**	**73,605**	**89,120**	**90,100**	**2,679.5**	**33.6**	**1.9%**
Unincorporated Grant County	26,406	35,370	40,134	40,395	2,625.5	15.4	1.3%
Incorporated Grant County	28,392	38,235	48,986	49,705	54.0	920.6	2.5%
George city	324	528	501	690	2.0	346.3	-0.5%
Mattawa town	941	2,609	4,437	4,460	0.7	6,506.1	5.5%
Moses Lake city (Grant County seat)	11,235	14,690	20,366	20,640	17.8	1,159.6	3.3%
Royal City	1,104	1,822	2,140	2,150	1.0	2,194.1	1.6%
Desert Aire CDP	na	1,124	1,626	1,640			3.8%

JURISDICTION	CENSUS 1990	CENSUS 2000	CENSUS 2010	CENSUS 2011	LAND AREA (SQ. MILES)	POPULATION DENSITY 2011 (PERSONS PER SQ. MILE)	AVERAGE ANNUAL GROWTH RATE, 2000-2010
George CCD	1,963	2,925	2,755	na			-0.6%
Mattawa-Royal City CCD (1)	6,101	11,121	14,870	na			2.9%
Kittitas County	**26,725**	**31,199**	**40,915**	**41,300**	**2,297.3**	**18.0**	**2.7%**
Unincorporated Kittitas County	10,418	13,588	18,063	18,315	2,281.6	8.0	2.9%
Incorporated Kittitas County	16,307	17,611	22,852	22,985	15.6	1,469.5	2.6%
Ellensburg city (Kittitas County seat)	12,360	13,277	18,174	18,250	7.1	2,561.8	3.2%
Kittitas city	843	1,105	1,381	1,430	0.6	2,304.1	2.3%
Vantage CDP	na	70	74	74			0.6%
Kittitas CCD	2,694	3,361	4,255	na			2.4%
Yakima County	**188,823**	**218,844**	**243,231**	**244,700**	**4,295.4**	**57.0**	**1.1%**
Unincorporated Yakima County	88,214	92,414	83,755	84,300	4,234.4	19.9	-1.0%
Incorporated Yakima County	100,609	126,430	159,476	160,400	61.0	2,628.5	2.3%
Grandview city	7,169	8,270	10,862	10,920	6.8	1,617.6	2.8%
Moxee city	825	819	3,308	3,415	1.7	2,052.3	15.0%
Selah city	5,113	6,164	7,147	7,205	4.4	1,625.8	1.5%
Sunnyside city	11,238	13,700	15,858	16,010	6.2	2,568.8	1.5%
Union Gap city	3,120	5,517	6,047	6,055	4.9	1,226.7	0.9%
Yakima city (Yakima County seat)	54,843	69,706	91,196	91,630	27.0	3,396.3	2.7%
Northeast Yakima CCD	5,717	6,544	9,106	na			3.4%
Sunnyside CCD	38,217	45,291	51,665	na			1.3%
Total population, Yakima, Kittitas, and Grant counties	**270,346**	**323,648**	**373,266**	**376,100**	**9,272**	**40.6**	**1.4%**
Total population, CCDs in which Alternative Routes are located except Benton County part	**14,512**	**21,026**	**28,231**	**na**			**3.0%**
Benton County	**112,560**	**141,652**	**175,177**	**177,900**	**1,700.4**	**104.6**	**2.1%**
Unincorporated Benton County	27,849	33,116	32,639	33,020	1,608.1	20.5	-0.1%
Incorporated Benton County	84,711	108,536	142,538	144,880	92	1,569	2.8%
Richland city	32,315	38,573	48,058	49,090	39	1,248	2.2%

JURISDICTION	CENSUS 1990	CENSUS 2000	CENSUS 2010	CENSUS 2011	LAND AREA (SQ. MILES)	POPULATION DENSITY 2011 (PERSONS PER SQ. MILE)	AVERAGE ANNUAL GROWTH RATE, 2000-2010
(Benton County seat)							
Northwest Benton CCD	9,728	11,877	13,622	na			1.4%
Block Group 1, Census Tract 118, Benton County			2,355				
State of Washington	**4,866,692**	**5,894,121**	**6,724,540**	**6,767,900**	**66,544.1**	**101.7**	**1.3%**

[1]Notes: A blank means data is unavailable.

Benton County is not part of the Study Region defined for socioeconomics but contains short parts of Alternative Routes.

CDP means Census Designated Place. A CDP is a geographic entity that serves as the statistical counterpart of an incorporated place for the purpose of presenting census data for an area with a concentration of population, housing, and commercial structures that is identifiable by name, but is not within an incorporated place.

CCD means Census County Division. These are county subareas larger than CDPs.

Projected Population

Population projections for the Study Region, like those for the State as a whole, generally predict a slowing rate of growth in 2010 to 2030, relative to the rates of growth since 1990. The mid-range projection by OFM (2007) call for the Study Region to grow by 1.0 percent annually through 2030, compared to 1.4 percent from 1990 to 2011 (Table 3.9-2). This growth rate varies according to scenario, with projected growth of 0.1 and 1.5 percent, respectively, under the low and high growth scenarios. Yakima County would grow by a slightly faster rate, and Grant County by a lower rate, than the regional average under all three growth scenarios. Population projections are shown in Table 3.9-2.

TABLE 3.9-2 POPULATION PROJECTIONS FOR STUDY REGION, THROUGH 2030

	2000	2005	2010	2015	2020	2025	2030	AVERAGE ANNUAL GROWTH RATE, 2010-2030
High								
Grant	74,698	79,100	96,565	104,425	110,922	117,349	123,302	1.2%
Kittitas	33,362	36,600	43,901	48,185	52,265	56,376	60,322	1.6%
Yakima	222,581	229,300	259,917	283,847	307,116	330,373	352,476	1.5%
3-County Region	330,641	345,000	400,383	436,457	470,303	504,098	536,100	1.5%
Statewide	5,894,121	6,256,400	7,372,751	8,042,721	8,713,386	9,379,550	10,026,660	1.5%
Medium								
Grant	74,698	79,100	88,389	92,719	95,623	98,303	100,449	0.6%
Kittitas	33,362	36,600	39,783	42,426	44,748	46,970	48,942	1.0%
Yakima	222,581	229,300	241,446	257,867	272,992	287,468	300,362	1.1%
3-County Region	330,641	345,000	369,618	393,012	413,363	432,741	449,753	1.0%

	2000	2005	2010	2015	2020	2025	2030	AVERAGE ANNUAL GROWTH RATE, 2010-2030
Statewide	5,894,121	6,256,400	6,792,318	7,255,672	7,698,939	8,120,510	8,509,161	1.1%
Low								
Grant	74,698	79,100	80,655	81,708	81,280	80,486	79,104	0.1%
Kittitas	33,362	36,600	36,402	37,653	38,483	39,102	39,398	0.4%
Yakima	222,581	229,300	224,303	233,240	240,233	245,929	249,601	0.5%
3-County Region	108,060	115,700	117,057	119,361	119,763	119,588	118,502	0.1%
Statewide	5,894,121	6,256,400	6,325,953	6,607,447	6,850,659	7,056,399	7,216,325	0.7%

Source: OFM 2007

3.9.2.2 Demographics

Age and Sex

The Study Region population had a younger median age than the state of Washington in 2010. The statewide median age was 37.2, compared to 32.2 in Grant County, 32.6 in Kittitas County, and 32.3 in Yakima County. In all areas, the female median age was slightly higher than the male median age. Median ages are shown in Appendix D, Table D-1.

Education

The proportions of the population 25 years of age and above who are graduates of both high school and college in Kittitas County are similar to the State of Washington (which itself has higher rates than the national average). In Grant and Yakima counties, the proportion of high school and college graduates are noticeably lower than Statewide, reflecting their predominantly farm economies. This is particularly the case in Yakima County, which had the lowest graduation rates in the region in 2010. Male high school graduation rates were noticeably lower than those of females in Grant and Yakima counties, but male college graduation rates were slightly higher. Educational attainment levels are shown in Appendix D, Table D-2.

Racial and Ethnic Characteristics

Race and ethnicity data are presented in this section for both the Study Region and Benton County because the Environmental Justice analysis included areas within Benton County as well as in the 3-county Study Region. In 2010, this 4-county area had, on average, substantially higher persons of Latino heritage than was the case for the state of Washington as a whole (32.7 versus 11.2 percent). Yakima County in particular had a high concentration of Latinos, at 45 percent of its population. However, Kittitas County was an exception, with only 7.2 percent of its population being of Latino heritage.

Persons of minority status other than Latino were less-represented in each of the counties in the 4-county area than statewide, with only one exception. Indian/Native Alaskans represented 3.7 percent of the total population in Yakima County, compared to 1.3 percent statewide. Race and ethnicity data are displayed in Table 3.9-3.

TABLE 3.9-3 RACIAL AND ETHNIC CHARACTERISTICS 2010, WASHINGTON, STUDY REGION, AND BENTON COUNTY

	WASHINGTON STATE	BENTON COUNTY	GRANT COUNTY	KITTITAS COUNTY	YAKIMA COUNTY	TOTAL, 4- COUNTY REGION
Total Population	6,724,540	175,177	89,120	40,915	243,231	548,443
Hispanic or Latino	755,790	32,696	34,163	3,121	109,470	179,450
% of Total Population	11.2%	18.7%	38.3%	7.6%	45.0%	32.7%
Not Hispanic or Latino: Population of one race:						
White alone	4,876,804	130,437	51,066	35,214	116,024	332,741
% of Total Population	72.5%	74.5%	57.3%	86.1%	47.7%	60.7%
Black or African American alone	229,603	2,031	710	339	1,743	4,823
% of Total Population	3.4%	1.2%	0.8%	0.8%	0.7%	0.9%
American Indian and Alaska Native alone	88,735	1,280	779	353	9,072	11,484
% of Total Population	1.3%	0.7%	0.9%	0.9%	3.7%	2.1%
Asian alone	475,634	4,621	783	795	2,359	8,558
% of Total Population	7.1%	2.6%	0.9%	1.9%	1.0%	1.6%
Native Hawaiian and Other Pacific Islander alone	38,783	221	54	56	142	473
% of Total Population	0.6%	0.1%	0.1%	0.1%	0.1%	0.1%
Some Other Race alone	11,838	260	95	52	331	738
% of Total Population	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%
Two or More Races:	247,353	3,631	1,470	985	4,090	10,176
% of Total Population	3.7%	2.1%	1.6%	2.4%	1.7%	1.9%

Source: 2010 U.S. Census.

3.9.2.3 Housing

Housing availability in the three-county Study Region was somewhat low in 2010, with a for-sale vacancy rate of 1.8 percent, and a rental vacancy rate of 5.3 percent. Rental vacancy rates below 5.0 percent are typically considered to signal a tight housing market. There were a total of 2,686 vacant units for rent in the Study Region. Housing data are shown in Table 3.9-4.

In the Local Area CCDs, the housing market is even tighter, with owner and rental vacancy rates of 1.4 and 3.7 percent, respectively, in 2010. The George CCD rental market was an exception, with a rental vacancy rate of 15.4 percent. There were 327 unoccupied housing units for rent in the Local Area CCDs. There were only three vacant, for rent units available in Moxee, the community closest to the southern Route Alternatives, with most of the rental availability in communities nearest the southern routes being in Yakima, Selah, and Union Gap cities.

Housing in Grant County is relevant for Route Alternatives D, F, and H, for which the northeastern routes are located on the east side of the Columbia River, in Grant County. The George and Mattawa-Royal City CCDs had a total of 72 vacant units for rent in 2010. The City of George itself had 35 of these units, with only six in Desert Aire and three in Mattawa; Vantage had no vacant, available rental units. Additional housing was available somewhat farther away from the Alternative Routes, in Ellensburg (303 vacant units for rent) and City of Kittitas (nine vacant units for rent).

Transient housing (e.g., hotels, motels, and RV parks) is likely to be of most importance to Project construction workers. These facilities are plentiful in the Study Regions primary cities of Yakima, Ellensburg, and Moses Lake. However, closer to the Alternative Routes, very little transient housing is available.

There are approximately 2,000 hotel rooms in the vicinity of the City of Yakima. Occupancy rates over a month's period recently have varied from about 30 percent to 60 percent. However, for several weeks during the year, hotels are essentially fully booked due to high school athletic tournaments at the Yakima Valley Sun Dome, or Yakima Convention Center events. During some of these times, such as during the state high school basketball tournament in March, hotel availability is very low as far as Ellensburg and Prosser in Benton County.

There are also numerous RV parks in the Yakima area. Among the closest to the Yakima County Route Alternatives are Yakima Sportsman State Park, Circle H RV Park, Trailers Inn RV Park, and the KOA Campgrounds. East of Yakima near SR 24, however, there are no hotels or RV parks. During the Summer and Fall peak season, vacancies are fairly low.

Hotel and RV availability in southwest Grant County is very low. The Desert Aire River Campground at Mattawa has only 10 spaces with hookups, which are typically fully occupied in summer and fall, but occupancy is low in winter (Skinner 2011).

Beyond the immediate Project vicinity in Grant County, one public RV facility, the Shady Tree RV Park with 49 hookups, is located in Quincy (near George). The Sun Basin RV Park is located east of George, and the Post Road Trailer Park is located in George (about 20 minutes drive from Vantage, and 35 minutes from Mattawa). Cave B Inn at Sagecliff is a higher-priced (approximately $200 per night) hotel with 55 rooms, located about 10 miles north of Vantage. The MarDon and O'Sullivan RV facilities are east of Royal City, but cater to hunting and fishing persons, with limits on availability for transient workers. Ample hotel and RV spaces are available in the Moses Lake area, about an hour from the Grant County alternative routes.

Just north of the Vantage Substation terminus, the Vantage Riverstone Resort in Kittitas County has 15 hotel rooms and six houses (holding up to five to six people apiece) available for rent. The Vantage Riverstone Resort also has a campground and RV park, with approximately 50 full hookups for RVs. Vacancies are limited in summer, and to a lesser degree, in fall. However, some availability is likely even in summer, but advance reservations are suggested. There is ample availability in late fall to late spring (Kwiatkowski 2011). Somewhat farther away from the alternative routes are the cities of Kittitas and Ellensburg (about a 30-minute drive to Vantage, and 50 minutes to Moxee), which also have substantial hotel and RV availability.

TABLE 3.9-4 HOUSING DATA FOR THE STUDY REGION, ITS CCDS, AND COMMUNITIES

	COUNTIES					CCDs IN PROJECT VICINITY							COMMUNITIES IN PROJECT VICINITY									
	GRANT COUNTY	KITTITAS COUNTY	YAKIMA COUNTY	STUDY REGION COUNTY TOTALS	BENTON COUNTY	GEORGE CCD	MATTAWA-ROYAL CITY CCD	KITTITAS CCD	NORTHEAST YAKIMA CCD	SUNNYSIDE CCD	LOCAL AREA CCD TOTALS	NORTHWEST BENTON CCD	DESERT AIRE CDP	ELLENSBURG CITY	GEORGE CITY	KITTITAS CITY	MATTAWA TOWN	MOXEE CITY	SELAH CITY	UNION GAP CITY	YAKIMA CITY	VANTAGE CDP
Total housing units	35,083	21,900	85,474	42,457	68,618	1499	4,524	1,782	3,145	15,379	26,329	4,691	973	7,867	168	579	843	1,032	2,759	2,173	34,829	39
Owner occupied	18,831	9,637	50,944	79,412	44,582	665	1,806	1,231	2,372	9,282	15,356	3,144	407	2,441	68	364	285	774	1,418	1,264	17,907	24
Percent of total occupied	62.7	58.1	63.2	62.4	68.3	70.7	49.5	75.4	78.2	63.5	58.3	70.5	72.9	33.4	51.9	67.0	36	76.3	53.3	61.3	54.1	80.0
Renter occupied	11,210	6,958	29,648	47,816	20,722	275	1,839	402	662	5,342	8,520	1,316	151	4,860	63	179	506	240	1,240	797	15,167	6
Percent of total occupied	37	42	37	38	32	29.3	50.5	24.6	22	26.5	41.7	30	27	66.6	48.1	33.0	64	23.7	46.7	38.7	46	20.0
Vacant housing units	5,042	5,305	4,882	15,229	3,314	559	879	149	111	755	2,453	231	415	566	37	36	52	18	101	112	1,755	9
Percent	14.4	24.2	5.7	10.7	4.8	37.3	19.4	8.4	3.5	4.9	9.3	4.9	42.7	7.2	22.0	6.2	6.2	1.7	3.7	5.2	5.0	23.1
For rent	948	475	1,263	2,686	1,084	50	22	21	20	214	327	66	6	303	35	9	3	3	55	20	691	0
Rented, not occupied	28	38	110	176	129	0	5	2	1	13	21	1	4	12	0	0	0	0	2	6	69	0
Rental vacancy rate, percent	3.0	8.0	8.7	5.3	4.9	15.4	1.2	4.9	2.9	3.8	3.7	4.8	1.4	5.9	35.7	4.8	5.8	0	4.2	2.4	4.3	0
For sale only	401	315	747	1,463	611	15	38	21	26	113	213	29	25	87	2	8	0	8	55	19	322	0
Sold, not occupied	52	34	163	249	219	4	5	0	3	33	45	5	4	9	0	0	0	0	2	12	57	0
For-sale vacancy rate	2.1	3.2	1.4	1.8	1.3	2.2	2.1	1.7	1.1	1.2	1.4	0.9	16	3.4	2.9	2.2	0	0	3.6	1.5	1.8	0
Vacant for seasonal, recreational, or occasional use	2,688	3,860	869	7,417	474	460	627	50	13	66	1,216	20	365	46	0	0	4	1	6	2	124	4
Percent of vacant units	53.3	72.8	17.8	48.7	14.3	82.3	71.3	33.6	11.7	8.7	49.6	8.7	1.0	8.1	0	0.0	7.7	22.2	4.0	3.6		44.4
Vacant for migratory workers	133	1	46	180	11	1	108	1	2	8	120	7	0	0	0	0	42	0	0	0	3	0
Other vacant	792	582	1,684	3,058	786	29	74	54	46	308	511	103	11	109	0	19	3	6	15	53	28	5
Percent of vacant units	15.7	11.0	34.5	20.1	23.7	5.2	8.4	36.2	41.4	40.8	20.8	44.6	2.7	19.3	0	52.8	5.8	33.3	14.9	47.3	1.6	5.8
Average household size, all occupied units (persons)	2.93	2.32	2.97	2.88	2.66	2.93	4.06	2.6	3.33	3.51	3.44	3.04	2.91	2.16	3.82	2.54	5.61	3.26	2.64	2.90	2.68	2.47
Population in housing units	87,875	38,498	239,746	366,119	173,751	2,751	14,781	4,249	9,076	51,277	82,134	13,575	1,626	15,784	501	1,381	4,437	3,308	7,022	5,985	88,619	74
Group quarters population	1,245	2,417	3,485	7,147	1,426	4	89	6	30	388	517	47	0	2,390	0	0	0	1	125	62	2,448	0

Source: U.S. Department of Commerce 2011a.

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3.9.2.4 Economy

Labor Force, Employment, and Unemployment

As was the case statewide and nationwide, the Study Region economy suffered greatly from the 2008-2009 recession, experiencing declines in employment from the peak year of 2008, accompanied by rapid rises in unemployment rates. This rapid economic deterioration was followed by a weak recovery, with job growth being spotty and slow, and unemployment rates continuing to rise in 2010. Some indication of a slight lowering of unemployment rates was experienced in 2011. However, the unemployment rate remains very high, at a 10 percent average for the first eight months of 2011 in the Study Region, compared to a statewide average of 9.4 percent. Kittitas County has fared slightly better than Grant or Yakima counties or the state of Washington, with a 2011 partial-year unemployment rate of 8.8 percent. Labor force data are shown in Table 3.9-5.

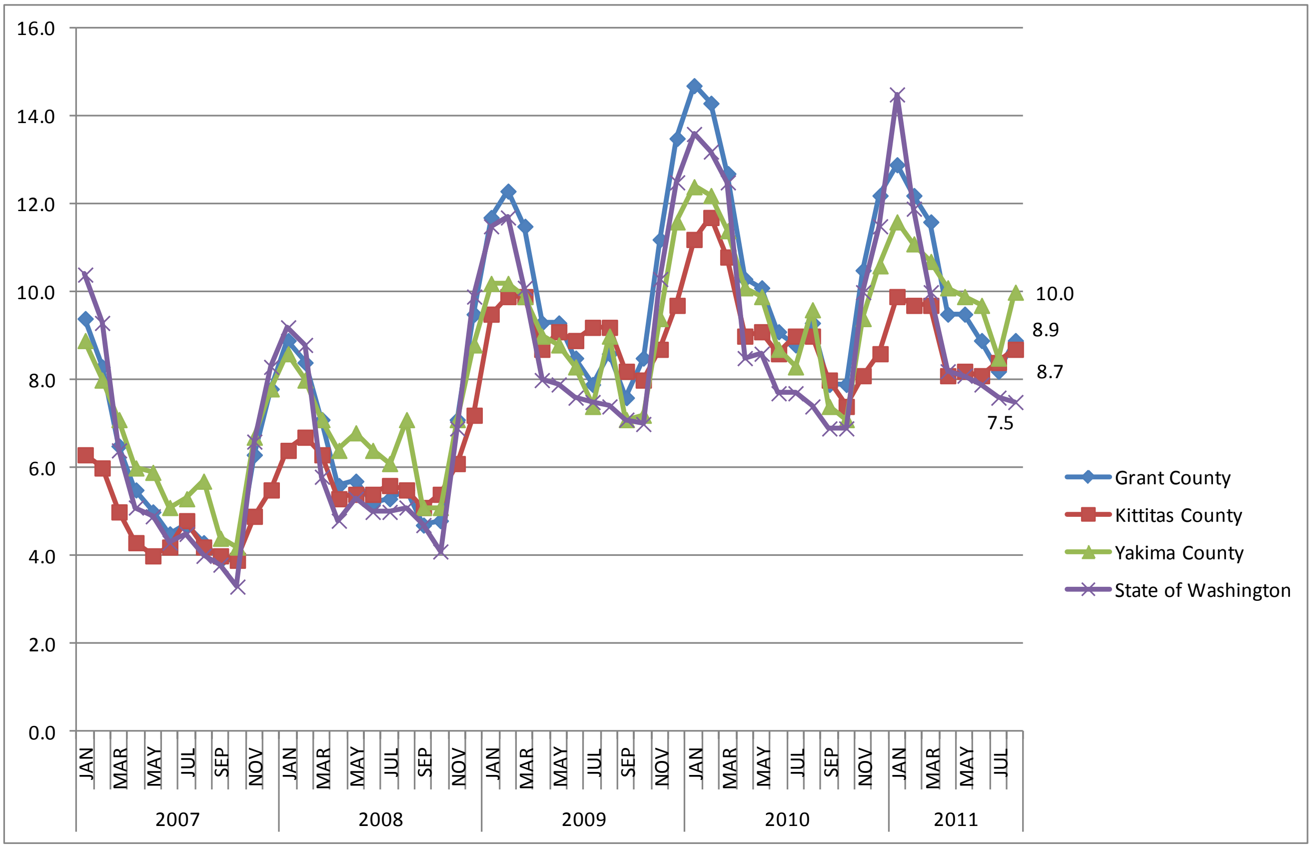
TABLE 3.9-5 EMPLOYMENT AND UNEMPLOYMENT IN THE STUDY REGION, 2007-2011

	2007	2008	2009	2010	2011 (Jan-Aug)
Grant					
Civilian Labor Force	40,140	40,810	42,280	42,250	41,970
Total Employment	37,830	38,210	38,100	37,810	37,710
Total Unemployment	2,310	2,610	4,170	4,450	4,260
Percent unemployed	5.8	6.4	9.9	10.5	10.1
Kittitas					
Civilian Labor Force	20,190	20,890	20,890	21,220	21,390
Total Employment	19,230	19,670	18,990	19,270	19,500
Total Unemployment	960	1,220	1,900	1,950	1,890
Percent unemployed	4.8	5.9	9.1	9.2	8.8
Yakima					
Civilian Labor Force	118,890	122,870	125,770	127,030	123,500
Total Employment	111,510	114,470	114,520	114,710	110,930
Total Unemployment	7,380	8,400	11,250	12,310	12,570
Percent unemployed	6.2	6.8	8.9	9.7	10.2
Yakima, Kittitas, and Grant					
Civilian Labor Force	179,220	184,570	188,940	190,500	186,860
Total Employment	168,570	172,350	171,610	171,790	168,140
Total Unemployment	10,650	12,230	17,320	18,710	18,720
Percent unemployed	5.9	6.6	9.2	9.8	10.0
State of Washington					
Civilian Labor Force	3,392,370	3,497,420	3,534,390	3,531,630	3,482,830
Total Employment	3,235,740	3,286,970	3,205,640	3,192,120	3,156,750
Total Unemployment	156,630	191450	328750	339,510	326,080
Percent unemployed	4.6	5.5	9.3	9.6	9.4

Source: WDES 2011a.

Employment fluctuates seasonally in the Study Region, particularly in the more farming-dependent Grant and Yakima counties. This creates substantial seasonal changes in the unemployment rates in the Study Region, with Grant and Yakima counties typically experiencing swings of four percent in their unemployment rates over the course of a year - to highs of about 12 percent in the last year. Monthly unemployment rates are depicted in Figure 3.9-2.

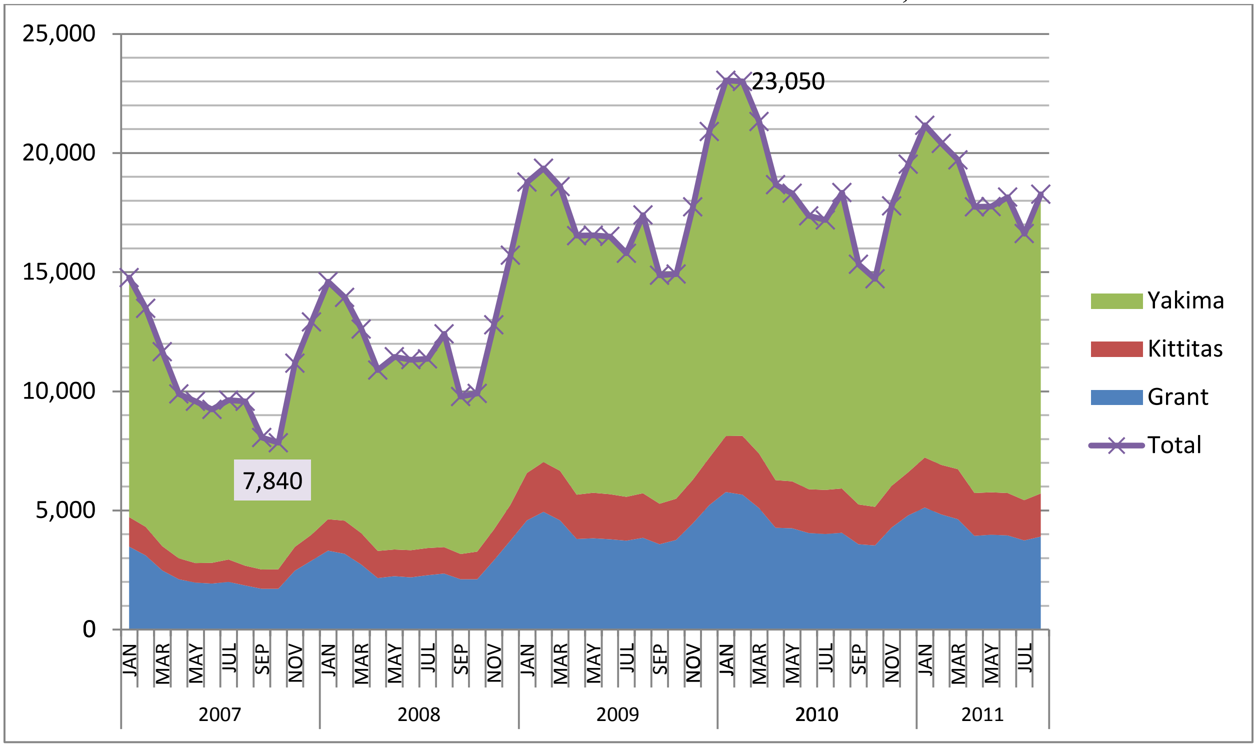
FIGURE 3.9-2 HISTORICAL UNEMPLOYMENT RATES, STUDY REGION COUNTIES AND THE STATE OF WASHINGTON, 2007-AUGUST 2011



Source: WDES 2011a.

The Study Region unemployed labor force reached a high of 23,050 in the winter of 2009-2010. In summer months, the number of unemployed was about 20,000 in 2011. With the historical unemployed labor force being around 10,000 in the relatively full-employment year of 2007, this indicates that even in the relatively busy summer months, there is substantial excess capacity in the local labor supply. Data on the historical unemployed labor force are shown in Figure 3.9-3.

FIGURE 3.9-3 HISTORICAL UNEMPLOYED LABOR FORCE, STUDY REGION COUNTIES AND THE STATE OF WASHINGTON, 2007-AUGUST 2011



Source: WDES 2011a.

Employment by Industry

As shown in Table 3.9-6, the Study Region economy, particularly Grant and Yakima counties, relies on agriculture to a much greater extent than the State as a whole; aside from the much smaller forestry, fisheries, and related sectors, farming is the only economic sector with substantial exports in any of the Study Region counties. The proportions of wage and salary employment represented by the farming sector were 18.1, 7.1, and 13.7 percent, respectively, for Grant, Kittitas, and Yakima counties in 2009, compared to the statewide average of 2.2 percent.

The Grant County economy is reliant for export income almost solely on agriculture, with some contribution by tourism-related sectors. The sectors with the largest wage and salary employment in 2009 were government (8,039 jobs), farming (7,603 jobs), manufacturing (4,145 jobs), retail (3,969 jobs), and accommodations (2,435 jobs). A location quotient analysis[1] showed that mining, construction, and manufacturing employment was only slightly more concentrated in Grant County than statewide; farming employment was substantially more concentrated in the County than statewide. All other sectors had location quotients lower than one. Construction, utilities, and real estate rental and leasing were the three fastest-growing sectors from 2001 to 2009. Employment data are shown in Table 3.9-6.

Total employment in Yakima County grew the most slowly of the three Study Region counties from 2001 to 2009 (0.9 percent annually, compared to 1.6 percent in Kittitas County and 1.1 percent in Grant County), and was the only of them to have lower employment growth than the 1.0 percent statewide

[1] Location quotients measure the concentration of employment (or income, or other industry characteristic) in a local area such as a county, relative to a larger area, such as a state. In general, if the location quotient for an industry is noticeably above 1.0, the industry is indicated to have substantive export employment; location quotients under 1.0 indicate little or no export employment.

growth rate. Yakima County employment is nearly as concentrated in the farming sector as in Grant County, although health care and social assistance, transportation and warehousing, and utilities employment are also somewhat high, compared to the state of Washington as a whole. The County's largest-employment sectors in 2009 were government (18,387 jobs), farming (16,662 jobs), health care and social services (15,470 jobs), and retail trade (12,627 jobs).

The Kittitas County economy is more connected to the Seattle region economy than are Grant or Yakima Counties. Employment in Kittitas County is more diversified, and grew the most rapidly of the three Study Region counties from 2001 to 2009, by 1.6 percent annually. Utility, finance and insurance, real estate rental and leasing, and educational services grew most rapidly. As of 2009, the largest-employing sectors were government (5,003 jobs), accommodations and food services (2,259 jobs), retail trade (2,204 jobs), and construction (1,216 jobs). In terms of industry concentration relative to statewide (indicating importance as exporting sectors), the leading industries were state government, farming, accommodations, and utilities.

Income

The economy of Yakima County dominates the Study Region economy, in terms of personal income, accounting for about two-thirds of total personal income. While having the largest amount of personal income comprised by farm wage and salary income in 2009 ($590 million), Yakima County's economy was less reliant on farming as a proportion of total personal income (11 percent) than was the Grant County economy (21.5 percent).

Farm proprietors, wage and salary income in the more diversified Kittitas County economy was less prominent, at 7.5 percent of total personal income, but still substantially above the statewide average of 1.8 percent in 2009. Personal transfer payments were also much higher for the three Study Region counties than statewide. Personal income data are shown in Table 3.9-7.

TABLE 3.9-6 NUMBER EMPLOYED BY INDUSTRY IN THE STUDY REGION, 2009 AND CHANGE SINCE 2001

INDUSTRY SECTOR	WASHINGTON			GRANT COUNTY			KITTITAS COUNTY			BENTON COUNTY		
	NUMBER	PERCENT OF TOTAL EMPLOYMENT	AVERAGE ANNUAL CHANGE 2001-09	NUMBER	PERCENT OF TOTAL EMPLOYMENT	AVERAGE ANNUAL CHANGE 2001-09	NUMBER	PERCENT OF TOTAL EMPLOYMENT	AVERAGE ANNUAL CHANGE 2001-09	NUMBER	PERCENT OF TOTAL. EMPLOYMENT	AVERAGE ANNUAL CHANGE 2001-09
Employment by place of work (number of jobs)												
Total employment	3,826,315	100.0	1.0	41,975	100.0	1.1	19,962	100.0	1.6	121,270	100.0	0.9
Proprietors employment	772,865	20.2	2.8	7,391	17.6	1.2	5,178	25.9	2.2	20,838	17.2	1.3
Farm employment	85,042	2.2	0.8	7,603	18.1	2.2	1,414	7.1	-0.1	16,662	13.7	0.9
Forestry, fishing, and related activities	37,867	1.0	0.2	1,724	4.1	na	(D)	na	na	7,297	6.0	5.4
Mining	7,962	0.2	3.9	114	0.3	na	(D)	na	na	145	0.1	16.1
Utilities	5,699	0.1	1.4	33	0.1	4.1	46	0.2	7.4	213	0.2	-0.2
Construction	223,603	5.8	0.5	2,010	4.8	4.9	1,216	6.1	2.8	4,671	3.9	0.8
Manufacturing	280,888	7.3	-2.0	4,145	9.9	-2.0	802	4.0	0.8	8,057	6.6	-4.1
Wholesale trade	136,087	3.6	0.4	1,376	3.3	1.1	575	2.9	0.7	4,759	3.9	0.2
Retail trade	382,284	10.0	-0.2	3,969	9.5	0.2	2,204	11.0	-0.4	12,267	10.1	0.5
Transportation and warehousing	109,355	2.9	0.4	1,305	3.1	3.1	403	2.0	-1.6	3,855	3.2	2.3
Information	114,740	3.0	0.7	251	0.6	-1.0	230	1.2	-0.2	986	0.8	-2.7
Finance and insurance	163,586	4.3	1.9	868	2.1	3.3	470	2.4	6.0	3,327	2.7	2.8
Real estate and rental and leasing	179,197	4.7	3.5	1,289	3.1	4.2	782	3.9	5.6	3,379	2.8	3.2
Professional, scientific, and technical services	274,503	7.2	2.4	925	2.2	na	742	3.7	na	3,485	2.9	0.9
Management of companies and enterprises	33,644	0.9	1.0	34	0.1	na	(D)	na	na	542	0.4	-1.1
Administrative and waste management services	179,429	4.7	1.3	1,010	2.4	0.1	(D)	na	na	2,747	2.3	-1.0
Educational services	67,569	1.8	3.1	209	0.5	0.8	265	1.3	4.4	1,666	1.4	2.5
Health care and social assistance	383,507	10.0	2.7	2,483	5.9	-1.0	1,188	6.0	-0.6	15,470	12.8	2.6
Arts, entertainment, and recreation	91,311	2.4	2.6	460	1.1	1.7	388	1.9	1.1	1,741	1.4	2.5
Accommodation and food services	242,668	6.3	1.1	2,435	5.8	3.4	2,259	11.3	3.3	6,336	5.2	1.4
Other services, except public administration	197,094	5.2	0.8	1,693	4.0	0.3	1,066	5.3	0.8	5,278	4.4	-0.8
Government and government enterprises	630,280	16.5	1.3	8,039	19.2	1.5	5,003	25.1	2.1	18,387	15.2	1.2
Federal, civilian	72,866	1.9	1.2	656	1.6	1.0	160	0.8	-0.8	1,291	1.1	-0.8
Military	81,107	2.1	1.3	272	0.6	-0.2	132	0.7	-0.1	843	0.7	-0.4
State and local	476,307	12.4	1.3	7,111	16.9	1.6	4,711	23.6	2.2	16,253	13.4	1.4

INDUSTRY SECTOR	WASHINGTON NUMBER	WASHINGTON PERCENT OF TOTAL EMPLOYMENT	WASHINGTON AVERAGE ANNUAL CHANGE 2001-09	GRANT COUNTY NUMBER	GRANT COUNTY PERCENT OF TOTAL EMPLOYMENT	GRANT COUNTY AVERAGE ANNUAL CHANGE 2001-09	KITTITAS COUNTY NUMBER	KITTITAS COUNTY PERCENT OF TOTAL EMPLOYMENT	KITTITAS COUNTY AVERAGE ANNUAL CHANGE 2001-09	BENTON COUNTY NUMBER	BENTON COUNTY PERCENT OF TOTAL. EMPLOYMENT	BENTON COUNTY AVERAGE ANNUAL CHANGE 2001-09
State government	151,380	4.0	1.2	844	2.0	1.2	2,602	13.0	na	3,054	2.5	0.6
Local government	324,927	8.5	1.3	6,267	14.9	1.7	2,109	10.6	na	13,199	10.9	1.6

Source: U.S. Department of Commerce 2011b.
Note: (D) means data suppressed due to confidentiality regulations. Suppressed sectors are typically very small.

TABLE 3.9-7 EMPLOYMENT INCOME BY INDUSTRY IN THE STUDY AREA, 2009 AND CHANGE SINCE 2001

DESCRIPTION	WASHINGTON			GRANT COUNTY			KITTITAS COUNTY			BENTON COUNTY		
	TOTAL	PERCENT OF TOTAL 2009	PERCENT OF TOTAL 1990	TOTAL	PERCENT OF TOTAL 2009	PERCENT OF TOTAL 1990	TOTAL	PERCENT OF TOTAL 2009	PERCENT OF TOTAL 1990	TOTAL	PERCENT OF TOTAL 2009	PERCENT OF TOTAL 1990
Personal income (thousands of dollars, by place of work)	$285,696,255	100.0	100.0	$2,557,014	100.0	100.0	$1,270,931	100.0	100.0	$7,474,024	100.0	100.0
Nonfarm personal income	$283,642,651	99.3	98.8	$2,225,143	87.0	86.7	$1,219,048	95.9	95.9	$6,884,190	92.1	91.8
Farm income	$2,053,604	0.7	1.2	$331,871	13.0	13.3	$51,883	4.1	4.1	$589,834	7.9	8.2
Net earnings by place of residence	$183,118,219	64.1	68.0	$1,523,604	59.6	62.5	$741,027	58.3	59.0	$4,311,734	57.7	60.8
Dividends, interest, and rent	$57,741,357	20.2	19.9	$410,217	16.0	20.1	$275,074	21.6	25.0	$1,276,579	17.1	20.6
Personal current transfer receipts	$44,836,679	15.7	12.1	$623,193	24.4	17.3	$254,830	20.1	15.9	$1,885,711	25.2	18.6
Components of earnings by place of work (thousands of dollars)												
Wage and salary disbursements	$146,807,512	51.4	55.9	$1,202,343	47.0	48.1	$468,665	36.9	42.0	$3,418,938	45.7	48.4
Supplements to wages and salaries	$36,871,952	12.9	13.1	$303,175	11.9	11.8	$123,873	9.7	10.1	$836,529	11.2	10.8
Employer contributions for employee pension and insurance funds	$24,156,360	8.5	7.3	$189,430	7.4	6.5	$80,527	6.3	5.8	$517,672	6.9	5.6
Employer contributions for government social insurance	$12,715,592	4.5	5.7	$113,745	4.4	5.3	$43,346	3.4	4.3	$318,857	4.3	5.2
Proprietors' income	$21,665,065	7.6	8.3	$271,998	10.6	13.7	$126,570	10.0	11.3	$618,901	8.3	8.3
Farm proprietors' income	$546,435	0.2	0.6	$155,134	6.1	8.2	$35,560	2.8	3.4	$183,486	2.5	2.8
Nonfarm proprietors' income	$21,118,630	7.4	7.7	$116,864	4.6	5.5	$91,010	7.2	7.9	$435,415	5.8	5.5

Source: U.S. Department of Commerce 2011c.

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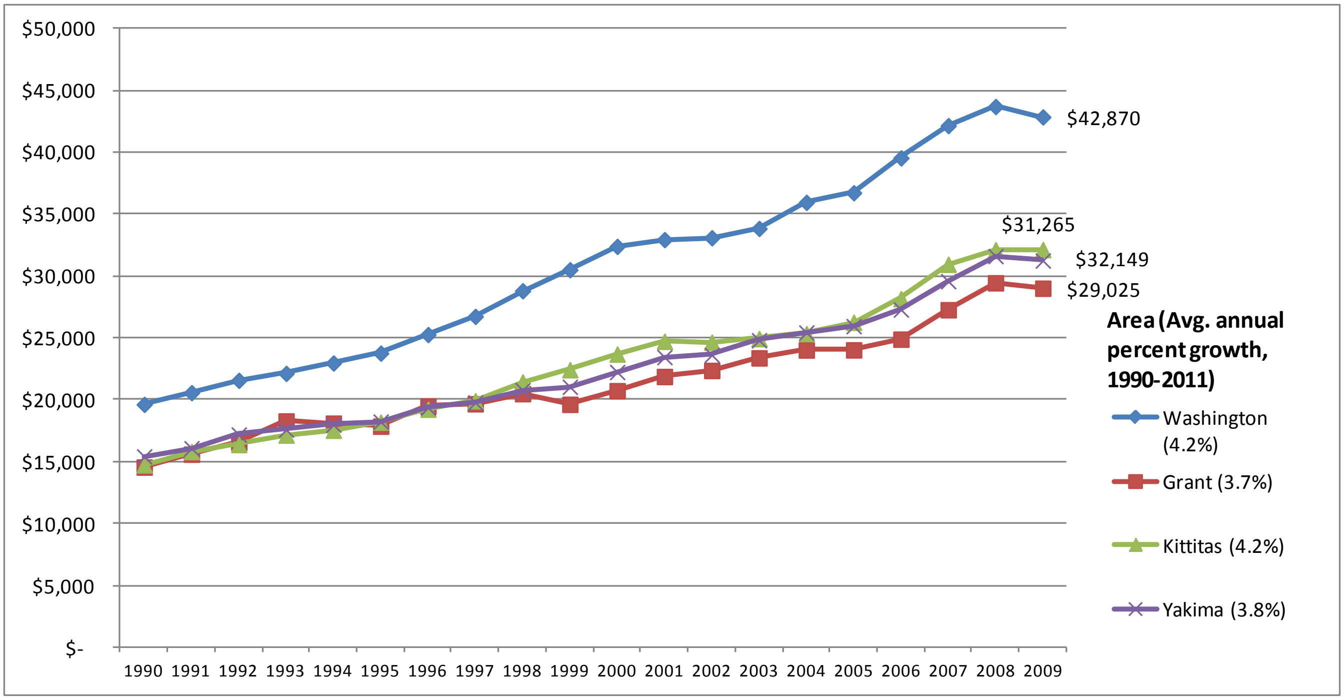
Reflecting its reliance on farm wage and salary employment, the Study Region has historically had lower per capita incomes than the State of Washington as a whole, and those incomes have grown more slowly than statewide. Kittitas County, with its more diversified economy, has the highest per capita incomes of the three Study Area counties ($31,265) in 2009, with the corresponding statewide figure being $42,870. Kittitas County per capita personal income also grew at the same average rate as the state of Washington, 4.2 percent, from 1990 to 2009. Per capita income trends are depicted in Figure 3.9-4.

FIGURE 3.9-4 PER CAPITA PERSONAL INCOME, STUDY REGION COUNTIES AND STATEWIDE, 1990-2011.



Source: U.S. Department of Commerce 2011c.

Farming Sector

For the Study Region, agriculture has held up as a backbone of the local economies, while statewide, agricultural income has declined precipitously. Table 3.9-8 shows that farm income remained constant as a proportion of total income in Kittitas County from 1990 to 2009, and declined only slightly in Grant and Yakima counties; Statewide, the proportion of total income earned in farming declined by almost 50 percent over the same period of time.

TABLE 3.9-8 COMPARISON OF PERCENT OF TOTAL PERSONAL INCOME EARNED IN FARM SECTOR, STUDY REGION COUNTIES AND STATEWIDE, 2009 AND 1990

	PERCENT OF TOTAL PERSONAL INCOME 2009	PERCENT OF TOTAL PERSONAL INCOME 1990
State of Washington	0.7%	1.2%
Grant County	13.0%	13.3%
Kittitas County	4.1%	4.1%
Yakima County	7.9%	8.2%

Source: U.S. Department of Commerce 2011a.

Yakima County agricultural sales of $1.2 billion in 2007 ranked it the number one producer in the state, while Grant County production ranks it at number two; Kittitas County ranked 19 out of a total of 39 counties in the state. Between 2002 and 2007, acreage in farms in Yakima County declined slightly, while farm acreage in Grant County actually increased, contrary to the statewide trend of declining farm acreage; in Kittitas County, farm acreage declined noticeably, by about 15 percent. The primary agricultural product in the Study Region is apples, which dominate the farm products category of "fruits, tree nuts, and berries." Milk and other dairy products from "cattle" and "cattle and calves" are next most important. Agricultural sales data are summarized in Table 3.9-9.

TABLE 3.9-9 SUMMARY OF FARM SECTOR CHARACTERISTICS, STUDY REGION COUNTIES, 2007 (DOLLAR FIGURES IN THOUSANDS)

FARM SECTOR CHARACTERISTIC	YAKIMA	KITTITAS	GRANT
Land in farms 2007 (acres)	1,649,281	191,087	1,087,952
Land in farms 2002 (acres)	1,678,984	230,646	1,074,074
Market value of products sold 2007	$1,203,806	$60,949	$1,190,191
State rank	1	20	2
Value of crops including nursery and greenhouse 2007	$787,459	$38,735	$846,945
State rank	2	19	1
Value of livestock, poultry, and their products 2007	$416,347	$22,214	$343,246
State rank	1	18	2
Market value of products sold 2002	$843,871	$56,364	$881,756
Leading value of sales by type, 2007			
Fruits, tree nuts, and berries	$577,526	(D)	$358,487
Milk and other dairy products from cows	$324,685	(D)	(D)
Other crops and hay	$129,987	$29,634	(D)
Cattle and calves	$81,962	$18,921	$251,337
Vegetables, melons, potatoes, and sweet potatoes	(D)	(D)	$205,070
Nursery, greenhouse, floriculture, and sod	(D)	437	(D)

Source: U.S. Department of Agriculture 2008.
Note: (D) means data suppressed due to confidentiality regulations. Suppressed sectors are typically very small.

Poverty Status

The Study Region has generally higher incidences of poverty than the statewide average. As shown in Table 3.9-10, data from the American Community Survey for 2009 income show that Yakima County, in particular, had a relatively high incidence of poverty. Compared to the statewide average of 8.2 percent of persons living in poverty, Yakima County had 22 percent, Grant County had 20.3 percent, Kittitas County had 19.4 percent, and Benton County 12.8 percent. The Washington Statewide average was 12.5 percent. The Benton County figures were quite similar to the statewide poverty proportions, largely because of high-wage jobs provided by the U.S. Department of Energy's Hanford Reservation.

TABLE 3.9-10 2009 POVERTY STATISTICS, STUDY REGION, BENTON COUNTY AND STATEWIDE

	WASHINGTON STATE		BENTON COUNTY		GRANT COUNTY		KITTITAS COUNTY		YAKIMA COUNTY	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Total:	6,528,364	100.0	169,462	100.0	86,102	100.0	38,868	100.0	235,979	100.0
Ratio of Income to Poverty Level:										
Under .50	362,784	5.6	8,066	4.8	6,256	7.3	4,129	10.6	19,546	8.3
Under 1.0	814,499	12.5	21,673	12.8	17,462	20.3	7,559	19.4	51,924	22.0
Under 1.5	1,338,412	20.5	36,179	21.3	27,238	31.6	11,298	29.1	89,683	38.0

	WASHINGTON STATE		BENTON COUNTY		GRANT COUNTY		KITTITAS COUNTY		YAKIMA COUNTY	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Under 2.0	1,870,741	28.7	48,428	28.6	37,929	44.1	14,824	38.1	116,471	49.4
2.0 or more	4,657,623	71.3	121,034	71.4	48,173	55.9	24,044	61.9	119,508	50.6

Source: U.S. Department of Commerce 2011c.

Economic Projections

No published quantitative economic projections are available specifically for any of the Study Region counties. However, the WDES (2011b) produces employment projections for sub-regions of the state that may be indicative of likely conditions in the Study Region over the next several years.

Kittitas, Klickitat, Skamania, and Yakima Counties are grouped in the South Central Workforce Development Area (WDA). This region is projected to experience employment growth averaging 1.2 percent annually from 2009 to 2014, then 1.2 percent growth, again, from 2014 to 2019. The agriculture, forestry, fishery, and hunting sector is projected to decline very slightly through 2014, and grow only by 0.8 percent annually through 2019. All growth projection rates are less than the projected statewide average annual growth projection of 1.4 percent. Employment related to construction and some manufacturing is projected to grow somewhat faster in the South Central WDA than the average rate of growth.

Adams, Chelan, Douglas, Grant, and Okanogan counties comprise the North Central WDA. This region is projected to experience employment growth averaging 1.3 percent annually from 2009 to 2014, then 1.4 percent growth, again, from 2014 to 2019. The agriculture, forestry, fishery, and hunting sector is projected to decline by 0.2 percent annually slightly through 2014, and grow by only 0.7 percent annually through 2019. Employment related to construction, some manufacturing, warehousing, and most retail activities is expected to grow at above-average rates.

3.9.2.5 Government Fiscal Conditions

Fiscal conditions for Study Region counties are described in this section, including Benton County conditions. Benton County is included because a short portion of Route Segment 3c would be located in Benton County, meaning some tax revenues (e.g., property, sales and use, public utilities) would be paid to Benton County jurisdictions.

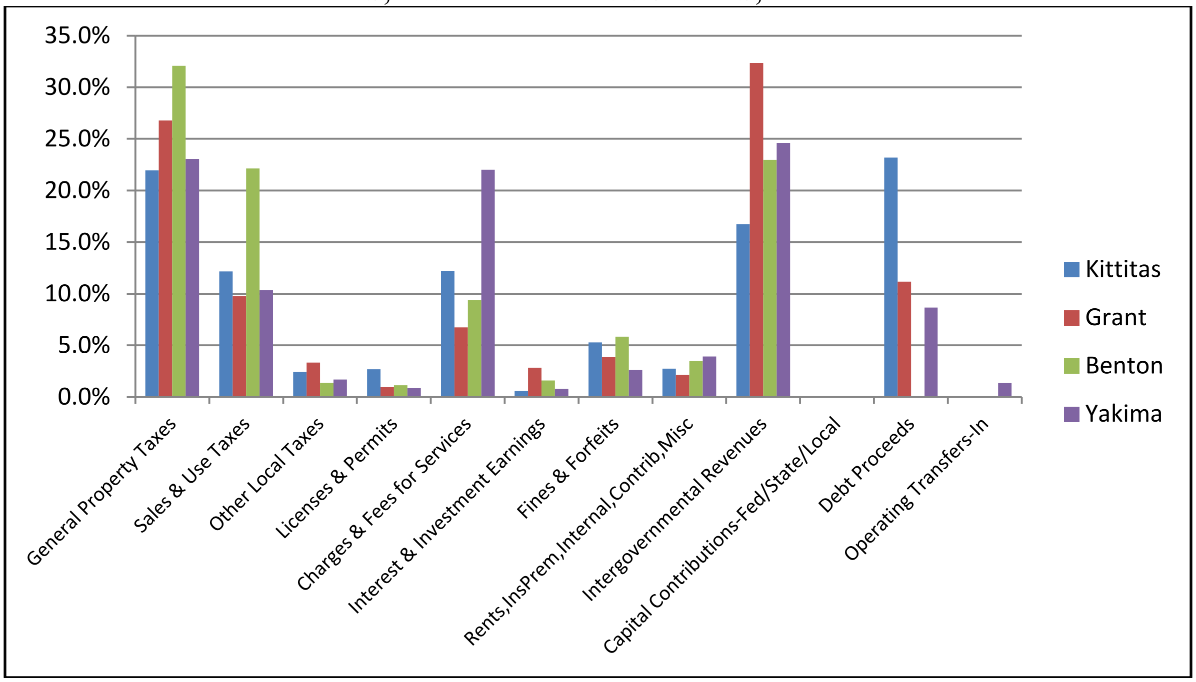
Overall County Budgets

The Local Government Financial Reporting System (LGFRS) compiles revenue and expenditure data for Washington cities and counties and presents those data in a consistent format on an annual basis (Washington State Auditor 2011). Because none of the alternative routes pass through any incorporated communities, county and special taxing district budgets would be the only ones directly affected by the proposed Project. The LGFRS data are summarized below for Benton, Grant, Kittitas, and Yakima counties and shown in Figure 3.9.5. Budgetary data are detailed in Appendix D, Tables D-3 through D-6.

Property, sales, and use taxes would be the primary tax payments generated by the alternatives. These two tax categories are also two of the four most prominent portion of revenues for the counties, with the third and fourth most important being intergovernmental revenues (mostly federal and state shared revenues) and charges and fees for services.

In the wake of the national recession of 2008-2009, counties in the Study Region, and Benton County, reduced their expenditures; Yakima County, in total, is an exception, but if health and human services expenditure increases, which are accompanied by large new service charges, are excluded, the remaining expenditures would have declined from 2008 to 2010. Property taxes in all four counties increased from 2008 to 2010, and only in Grant County did sales and use taxes decline significantly, with sales and use tax receipts increasing in Benton County, and declining only slightly in Yakima and Kittitas Counties. In general, the primary fiscal problem for the 4-counties was declining intergovernmental revenues.

FIGURE 3.9-5 PERCENTAGE SOURCES OF COUNTY REVENUES, BENTON, GRANT, KITTITAS, AND YAKIMA COUNTIES, 2010



Source: Washington State Auditor 2011.

Property Valuation and Taxation

Property tax receipts are the backbone of most cities' and counties' abilities to fund services. In the Study Region and Benton County, these receipts are the number one stable revenue source (intergovernmental revenues were higher in 2010, but tend to vary, and are generally outside the control of counties).

All real and personal property in Washington is subject to property tax based on 100 percent of its fair market value, unless a specific exemption is provided by law. Property is assessed on January 1 of the assessment year. The Washington Department of Revenue (WDOR) is responsible for levying the state property tax for common schools, and the remainder of property tax is levied at the county level.

Property tax levies are subject to several statutory and constitutional limits. The "101% levy lid" restricts individual taxing districts to collect a maximum one per cent increase over the highest amount collected since 1985 for their regular levy, plus an amount attributable to new construction within, or annexations to, the district. This law applies to a taxing district-wide budget and not too individual properties (RCW 84.55.010).

Benton County Property Valuation and Taxation

Benton County property tax rates and 2011 levies for county-wide property taxes are shown in Appendix D, Table D-7. Including state school taxes, Benton County total property tax levies for 2011 were $53.7 million.

Property taxes are also collected by such entities as individual school districts, port districts, fire districts, special taxing districts (e.g., hospitals, water and sewer, mosquito), depending on the location of the subject property. The total County-wide levy was $1.3264866 per $1,000 of assessed value, and the statewide school levy is $2.14780488 per $1,000 of assessed value. Property tax data are detailed in Appendix D, Table D-7.

Grant County Property Valuation and Taxation

Including state school taxes, total Grant County property tax levies were $31.2 million.
Property taxes are also collected by such entities as individual school districts, port districts, fire districts, special taxing districts (e.g., hospitals, water and sewer, mosquito), depending on the location of the subject property. The total county-wide property tax rate was 1.71933 per $1,000 of assessed value. The state school property tax rate was $2.20769 per $1,000 of assessed valuation. Grant County property tax rates and 2011 levies for county-wide property taxes are shown in Appendix D, Table D-8.

Kittitas County Property Valuation and Taxation

Including state school taxes, total Kittitas property tax levies in 2010 (for payment in 2011) were $23.3 million. The county-wide rate was $1.04942. The state schools property tax rate was $2.064551 per $1,000 of assessed valuation.

Property taxes are also collected by such entities as individual school districts, port districts, fire districts, special taxing districts (hospitals, water and sewer, mosquito, etc.), depending on the location of the subject property. Kittitas County property tax rates and 2011 levies for county-wide property taxes are shown in Appendix D, Table D-9.

Yakima County Property Valuation and Taxation

Yakima County is the state's second largest county in land area, but in excess of 70 percent of the county land is within the JBLM YTC, BLM, or the Yakima Indian Reservation, and therefore not subject to ad valorem taxation.

Yakima County property values did not substantially decline in the recent recession, unlike most of the United States. In 2009, the average price of a single family residence was $164,112. In 2010, the average was $164,508, a 0.2 percent increase. Thus, county property tax receipts, shown in Table 3.9-12, increased from 2008 to 2010 (Yakima County 2011a).

Ad valorem tax rates generally remained consistent between 2010 and 2011, with most taxing districts increasing their tax amounts by the one percent limit on the legally allowed increase from the previous highest levy. The 2010 total county assessment subject to property taxes was $15,056,805,667.

There are 52 taxing districts in the county, including the state school levy and 14 cities (none of the Route Alternatives are in cities). County-wide tax rates set in 2010 for taxes paid in 2011 are shown in Table 3.9-11.

TABLE 3.9-11 YAKIMA COUNTY-WIDE AD VALOREM PROPERTY TAX RATES, 2010 FOR TAXES PAYABLE 2011 (DOLLARS PER THOUSAND DOLLARS OF VALUATION)

TAXING DISTRICT	RATE
County emergency medical services	0.21481536
County flood control	0.08546675
State school levy	2.20865145
Yakima County	1.52026910
Yakima County road	2.05869829
Yakima school bonds	1.53349782
Yakima school maintenance & operation	2.89057733
Yakima Valley regional library	0.45293972
Total county-wide rate	**8.75722582**

Source: Yakima County 2011a.

Yakima County property tax levies as reported by the County Treasurer (Yakima County 2011b) have increased gradually over the past three years. These levies are shown in Table 3.9-12. Property taxes are also collected by such entities as individual school districts, port districts, fire districts, special taxing districts (irrigation, conservation, mosquito, diking, drainage, weed, stormwater, horticulture, State Game and State Forest Patrol Assessments), depending on the location of the subject property.

TABLE 3.9-12 YAKIMA COUNTY PROPERTY TAX LEVIES

	2010	2009	2008
State School	$30,213,928	$27,836,666	$27,636,551
Local School	$59,127,437	$56,942,739	$53,771,235
Yakima County	$22,429,326	$21,926,159	$21,351,596
County Road	$12,533,931	$12,291,243	$11,851,885
County Flood	$1,264,337	$1,234,631	$1,195,953
Fire Districts	$6,950,092	$6,817,993	$6,739,143
Cities and towns	$25,078,523	$24,627,621	$24,024,733
EMS	$3,161,362	$3,087,101	$2,990,377
Other Districts*	$7,079,785	$6,943,312	$6,717,370
Special Assessments**	$6,384,871	$6,304,911	$4,565,887
Total	**$174,223,592**	**$168,012,376**	**$160,844,730**

*Includes Library, Port, and Park Districts
*Includes Irrigation, Conservation, Mosquito, Diking, Drainage, Weed, Stormwater, Horticulture, State Game, and State Forest Patrol Assessments.
Source: Yakima County 2011b.

Retail Sales and Use Tax

Total sales and use taxes collections for each county in the Study Region, and Benton County, were reported in Appendix D, Tables D-7, D-8 and D-9 and Table 3.9-12 and Figure 3.9-5. The Statewide retail sales and use tax rate is 6.5 percent of all retail purchases. Cities, counties, and Public Transportation Benefit Areas (PTBAs) in the Study Region plus Benton County levy their own additional sales and use taxes. These are shown in Table 3.9-13. These data show that the combined state and local tax rate in the Study Region plus Benton County ranges from 7.9 to 8.3.

TABLE 3.9-13 SALES AND USE TAX RATES IN THE STUDY REGION AND BENTON COUNTY, PERCENT (LOCAL RATES ARE IN ADDITION TO THE STATE RATE)

GEOGRAPHIC AREA	RATE
Statewide	6.5
Benton County unincorporated	1.2
Benton County cities	1.8
Benton County PTBA*	1.8
Grant County unincorporated	1.4
Grant County cities	1.4
Kittitas County unincorporated	1.5
Kittitas County cities	1.5
Yakima County unincorporated	1.4
Yakima County cities	1.4

*PTBA means Public Transportation Benefit Area.
Source: WDOR 2011.

Business and Occupation Tax and Public Utilities Tax

The Washington State Business and Occupation (B&O) tax is a gross receipts tax. It is measured on the value of products, gross proceeds of sale, or gross income of the business. Washington does not have an income tax. Washington's B&O tax is calculated on the gross income from activities. This means there are no deductions from the B&O tax for labor, materials, taxes, or other costs of doing business.

The Public Utilities Tax is in lieu of the B&O tax. For the generation and distribution of electric power, the rate is 0.03873 of the value of electric sales. Nearly all of the funds (98.6 percent in 2009 [Washington Department of Revenue 2010]) are distributed into the state general fund. The remainder are earmarked for the state public works assistance fund, to assist local governments in maintaining public works facilities.

Exemptions from the Public Utility Tax specific to electricity providers include (WDOR 2010):

- credit for income of electric/gas utilities from sales of power to direct service industries;
- credit for electric and natural gas utilities that provide billing discounts to low-income customers;
- credit for payments for self-generated energy (expires 6/30/2020); and
- credit for investment cost recovery payments (expires 6/30/2016).

Exemptions from the Public Utilities Tax are provided for by Washington State Law for exchanges and re-sales among electricity providers under RCW-82.04-310. These exemptions are for:

"(11) **Exchanges by light and power businesses.** There is no specific exemption which applies to an "exchange" of electrical energy or the rights thereto. However, exchanges of electrical energy between light and power businesses do qualify for deduction in computing the Public Utility Tax as being sales of power to another light and power business for resale. An exchange is a transaction which is considered to be a sale and involves a delivery or transfer of energy or the rights thereto by one party to another for which the second party agrees, subject to the terms and conditions of the agreement, to deliver electrical energy at the same or another time. Examples of deductible exchange transactions include, but are not limited to, the following:

(a) The exchange of electric power for electric power between one light and power business and another light and power business;

(b) The transmission or transfer of electric power by one light and power business to another light and power business pursuant to the agreement for coordination of operations among power systems of the pacific northwest executed as of September 15, 1964;
(c) The Bonneville Power Administration's (BPAs) acquisition of electric power for resale to its Washington customers in the light and power business;
(d) The residential exchange of electric power entered into between a light and power business and the administrator of the BPA pursuant to the Pacific Northwest Electric Power Planning and Conservation Act, P.L. 96-501, Sec. 5(c), 16 U.S.C. 839(c) (Supp. 1982). In some cases, power is not physically transferred, but the purpose of the residential exchange is for BPA to pay a "subsidy" to the exchanging utilities. For public utility tax reporting purposes, these subsidies will be treated as a nontaxable adjustment (rebate or discount) for purchases of power from BPA." (Washington State Legislature n.d.).

3.10 ENVIRONMENTAL JUSTICE

3.10.1 Regulatory Framework

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations (Federal Register 1994) was enacted to reinforce Title VI of the Civil Rights Act of 1964. In the Civil Rights Act it is stated that "No person in the United States shall, on the grounds of race, color, or national origin be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance" (United States Code [U.S.C.] 1964). Executive Order 12898 states, "Each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations" (Federal Register 1994). Additional guidance from the President's Council on Environmental Quality (CEQ) clarified that environmental justice concerns could arise from effects on the natural and physical environment that produce human health or ecological outcomes, or from adverse social or economic changes.

The Executive Order requires that impacts on minority or low-income populations be analyzed for the geographical area in which the Project would be located to determine if there would be a disproportionately high and adverse impact on minority and/or low-income populations. If the demographic analysis reveals that disproportionately high and adverse impacts would occur, mitigation then needs to be proposed to address the effects. Standard approved methods for evaluation of environmental justice impacts are included within the CEQ document, "Environmental Justice Guidance under the National Environmental Policy Act" (NEPA; CEQ 1997). These methods were used for the evaluation of the proposed Project that is described in this section.

The Environmental Protection Agency (EPA) defines "environmental justice (EJ)" as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair Treatment means that no group of people should bear a disproportionate burden of environmental harms and risks, including those resulting from the negative environmental consequences of industrial, governmental, and commercial operations or programs and policies. Meaningful involvement means that: 1) potentially affected community members have an appropriate opportunity to participate in decisions about a proposed activity that will affect their environment and/or health; 2) the public's contribution can influence the regulatory agency's decision; 3) the concerns of all participants involved will be considered in the decision-making process; and 4) the decision-makers seek out and facilitate the involvement of those potentially affected. "An....action may involve an EJ concern if it could:

- Create new disproportionate impacts on minority, low-income, or indigenous populations.
- Exacerbate existing disproportionate impacts on minority, low-income, or indigenous populations.
- Present opportunities to address existing disproportionate impacts on minority, low income, or indigenous populations that are addressable through the action under development.
- "... it is important to assess whether minority, low-income, or indigenous populations are experiencing existing disproportionate impacts that you can address through your action" (EPA 2010).

3.10.2 Methodology

According to CEQ (1997) and EPA (2010) guidelines established to assist federal and state agencies for developing strategies to examine EJ impacts, the first step in conducting an EJ analysis is to define minority and low-income populations. Based on these guidelines, a minority population is present in a project study area if: (a) the minority population of the affected area exceeds 50 percent; or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

The second step of an EJ analysis requires a finding of a high and adverse impact. The CEQ guidance indicates that when determining whether the effects are high and adverse, agencies are to consider whether the risks or rates of impact "are significant (as employed by NEPA) or above generally accepted norms."

The final step requires a finding that the impact on the minority or low-income population be disproportionately high and adverse. Although none of the published guidelines define the term "disproportionately high and adverse," CEQ states that an effect is disproportionate if it appreciably exceeds the risk or rate to the general population.

For a minority population, the specific thresholds recommended by the CEQ (1997) are as follows: 50 percent minority population (absolute threshold); the national average minority population – 25 percent (absolute threshold); and the state average plus 20 percent (i.e., state average times 1.2) (relative threshold) (CEQ 1997). These are guidelines rather than requirements.

The CEQ recommended threshold for determining a low-income population is based on "very low-income" and/or "low-income" characteristics. The very low-income characteristic is defined as persons in households below the U.S. Census Bureau's poverty threshold. The low-income characteristic is defined as below two times the poverty threshold (CEQ 1997). The poverty thresholds are designated by the Census Bureau for the nation. The 2010 Census poverty data are not yet available for Census Block Groups. Thus, the Census 2000 data, which reflect incomes for 1999, were used in this analysis.

The EJ study area is an approximately three mile radius surrounding the Project area. All census tracts touching on the three mile radius were included in the analysis. The reason for the choice of a three mile radius were that the effects of transmission lines (construction noise and dust, potential electromagnetic field impacts, potential land value impacts, and visual impacts) that could be relevant for EJ analysis are likely to occur within about a two mile distance; a three mile distance was used to ensure geographic comprehensiveness.

3.10.3 Data Sources

The data source for the EJ analysis of race and ethnicity used the 2010 Census National Summary File of Redistricting Data. Specifically, the dataset from Table P2, Hispanic or Latino, and Not Hispanic or Latino by Race, was used The low-income analysis used Census 2000 Summary File 3 (SF 3) - Sample Data, Table P88, Ratio of Income to Poverty Level in 1999. For both analyses, data for all Census Block Groups that are within three miles of the alternative routes (in full or in part) were extracted, tabulated, and analyzed.

3.10.4 Current Conditions and Trends, Regional Overview (Analysis Area/ Counties)

Current regional conditions in the EJ Study Area (Benton, Grant, Kittitas, and Yakima counties) for race and ethnicity were described in Section 3.9.2.2. Current regional conditions for low-income populations were discussed in Section 3.9.2.4.

3.10.5 Minority Population

In the three mile radius EJ Study Area, there are generally greater concentrations of the minority population of Latinos than in the state as a whole. Other minority groups are present to a lower degree than statewide or in the EJ Study Area.

The Latino population represented 32.7 percent of the total population in the 4-county EJ Study Area, compared to 11.2 percent statewide. There was also a higher concentration of non-Latinos of "two races or more," although the percentages of the totals are very low (2.3 percent in the EJ Study Area, and 0.2 percent statewide). All major minority populations of the remaining races defined as minority (those other than White, consisting of Black or African American, American Indian or Native Alaskan, Asian, Native Hawaiian or Pacific Islander, and some other race) are under-represented in the EJ Study Area relative to statewide.

The differences in nearby populations' racial and ethnic characteristics among Alternative Routes were minimal; of the eight alternative routes in the three mile radius areas, four were exact duplicates; only four different distributions resulted (Alternatives A and F, B and E, C and G, and D and H were exactly the same). The differences that did exist among alternatives, in terms of racial and ethnic distributions and averages, were very small. The reason is that any differences among alternative routes were due to the presence or absence of only three Block Groups in their three mile radius area. These results are tabulated in Table 3.10-1 and detailed in Appendix D, Socioeconomic and Environmental Justice Supporting Data.

TABLE 3.10-1 SUMMARY OF RACE AND ETHNICITY OF CENSUS BLOCK GROUPS WITHIN THREE MILES OF ROUTE ALTERNATIVES

	ALTERNATIVE			
	A AND F	B AND E	C AND G	D AND H
Total	63,556	63,551	66,232	66,237
Hispanic or Latino	25,559 40.2%	25,559 40.2%	26,794 40.5%	26,794 40.5%
Not Hispanic or Latino				
Total Not Hispanic or Latino	37,997 59.8%	37,992 59.8%	39,438 59.5%	39,443 59.5%
White alone	35,162 55.3%	35,160 55.3%	36,537 55.2%	36,539 55.2%
Black or African American alone	483 0.8%	483 0.8%	493 0.7%	493 0.7%
American Indian and Alaska Native alone	788 1.2%	788 1.2%	806 1.2%	806 1.2%
Asian alone	418 0.7%	417 0.7%	420 0.6%	421 0.6%
Native Hawaiian and Other Pacific Islander alone	49 0.1%	49 0.1%	49 0.1%	49 0.1%
Some Other Race alone	70 0.1%	70 0.1%	73 0.1%	73 0.1%
Two or More Races:	1,027 1.6%	1,025 1.6%	1,060 1.6%	1,062 1.6%

3.10.6 Low-Income Population

Census poverty data for the 4-county region and for the state of Washington were described in Section 3.9.2.4. These data indicated higher proportions of persons living in poverty in the 4-county region (Benton, Grant, Kittitas, and Yakima counties) as a whole than statewide in 2009, although Benton County had lower proportions of persons under the poverty level, and under twice the poverty level, than the Washington Statewide average.

Comparison of the poverty status of the population in the area within three miles of the Alternative Routes and statewide conditions relies on 1999 data from the Census Bureau 2000 Census because poverty data collected in the 2010 Census have not yet been published as of the date of writing of this EIS.

In 1999, persons with incomes below the poverty level (established by the U.S. Census Bureau [undated]) represented 16.5 percent of the total population in the 4-county region, compared to 10.8 percent statewide.[1] The corresponding ratio of persons with incomes under twice the poverty level was 33 and 22 percent. Comparing these data to the 2009 data presented in Table 3.9-10 indicates that the proportions and numbers of people living in poverty in both the state of Washington and the 4-county region increased between 1999 and 2009. In part, this reflects the recession of 2008-09; Figure 3.9-4 shows the dip in per capita incomes that occurred between 2008 and 2009. However, even accounting for the recession, the increase in poverty in the 4 county region is notable.

In the three mile radius EJ Study Area, there were generally greater concentrations of low-income persons than in the State as a whole in 1999. For all Census Blocks within three miles of any alternative route, the ratios were 19.5 percent under the Poverty Level, and 39.5 percent under twice the Poverty Level.

As with the racial and ethnic characteristics described in section 3.10.5, the differences in the proportions of persons living in poverty within three miles of each of the alternative routes were very small. This lack of distinction is due to the fact that there was not much difference in the Block Groups included within the three mile radius among route alternatives. A total of 33 Block Groups were within three miles of any Alternative Route in the 2000 Census (Block Group definitions changed somewhat between the 2000 and 2010 censuses); the differences among Alternative Routes were due to inclusion or non-inclusion of only three Block Groups. As with the 2010 Census used for the EJ analysis of race and ethnicity, for the 2000 Census, of the eight Alternative Routes' three mile radius areas, four were exact duplicates. Thus, only four different distributions resulted (Alternatives A and F, B and E, C and G, and D and H were exactly the same). The distinctions in terms of populations living in poverty among the Alternative Routes were very slight. These results are summarized in Table 3.10-2, and fully tabulated in Appendix D, Socioeconomic and Environmental Justice Supporting Data.

[1] It should be noted that differences in the cost of living between the 4-county region and statewide averages are probably offset by different costs of living. However, no cost of living figures are available for small areas such as the 4-county region.

TABLE 3.10-2 SUMMARY OF LOW INCOME POPULATIONS OF CENSUS BLOCK GROUPS WITHIN THREE MILES OF ROUTE ALTERNATIVES, 4-COUNTY REGION, AND STATE OF WASHINGTON

	TOTAL POPULATION	BELOW POVERTY LEVEL		BELOW 1.5 TIMES POVERTY LEVEL		BELOW TWICE POVERTY LEVEL	
		NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Alternative Routes A and F	51,353	9,734	19.0%	17,159	33.4%	19,760	38.5%
Alternative Routes B and E	51,316	9,734	19.0%	17,159	33.4%	19,760	38.5%
Alternative Routes C and G	54,147	10,589	19.6%	18,705	34.5%	21,461	39.6%
Alternative Routes D and H	54,184	10,589	19.5%	18,705	34.5%	21,461	39.6%
4-County Region	464,966	76,518	16.5%	129,456	27.8%	153,540	33.0%
State of Washington	5,765,201	612,370	10.6%	1,037,422	18.0%	1,270,094	22.0%

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3.11 CULTURAL RESOURCES AND NATIVE AMERICAN CONCERNS

Cultural resources are prehistoric or historic archaeological sites, districts, buildings, structures, or objects considered to be important to a culture, subculture, or community for scientific, traditional, religious or any other reason. A cultural resource is a definite location of human activity, occupation, or use identifiable through field inventory (survey), historical documentation, or oral evidence. The term includes archaeological and architectural sites, structures, or places with important public and scientific uses, and may include definite locations of traditional cultural or religious importance to specified social or cultural groups. Cultural resources may be, but are not necessarily, eligible for listing in the National Register of Historic Places (National Register), the nation's list of historic places worthy of preservation. For this Environmental Impact Statement (EIS), cultural resources have been divided into archaeological resources, architectural resources, and traditional cultural properties (TCPs).

Archaeological resources are locations where human activity has measurably altered the earth (e.g., ditches, mounds, earthworks) or left deposits of physical remains (e.g., stone tools, building foundations, cairns, bottles, cans). Archaeological resources are often classified as either sites or isolated finds based on the quantity, density, and type of material. Generally, isolated finds are one or a few objects (e.g., an arrowhead, a bottle). Sites are larger than isolated finds and may contain several artifacts to many thousands of artifacts or features within a clearly defined area.

Architectural resources are standing buildings or structures. Buildings are used for shelter, for example: houses, churches, stores, schools, and barns. Structures are architectural features not used for shelter, such as dams, canals, bridges, and transmission lines.

A TCP is a property that is eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that are rooted in that community's history, and are important in maintaining the continuing cultural identity of the community. TCPs may include resources with petroglyphs, pictographs, graves, and ceremonial features.

3.11.1 Data Sources

A cultural resource record search for the proposed Project was conducted in 2010 and 2011 by collecting information on previously recorded cultural resources and past cultural resource investigations within one mile either side of the centerlines for each of the alternative route segments. The principal source of data was the Washington Department of Archaeology and Historic Preservation (DAHP) on-line Washington Information System for Architectural and Archaeological Records Data (WISAARD) database.

Additionally, the following government agencies were contacted regarding cultural resource information that had not yet been submitted to the DAHP:

- Bureau of Reclamation (Reclamation)
- Bonneville Power Administration (BPA)
- Bureau of Land Management (BLM)
- Joint Base Lewis-McChord Yakima Training Center (JBLM YTC)
- Washington Department of Fish and Wildlife (WDFW)
- Grant County Public Utility District (Grant County PUD)

Other data sources were examined to determine whether certain classes of specially designated cultural resources existed within or near the Project area. These included:

- National Historic Landmarks. National Historic Landmarks (NHLs) are nationally significant historic places designated by the Secretary of the Interior because they possess exceptional value or quality in illustrating or interpreting the heritage of the United States. The nearest NHL to the Project area is the B Reactor located at the Department of Energy's Hanford Site near Richland in Benton County.
- National Register of Historic Places. The National Register is the National Park Service's official list of the nation's historic places worthy of preservation. The National Register is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect America's historic and archeological resources.
- Washington Heritage Register. The Washington Heritage Register is an official listing of historically significant sites and properties found throughout the state. The list is maintained by the DAHP.

The Cultural Resources Program of the Confederated Tribes and Bands of the Yakama Nation (under contract with Pacific Power) collected oral histories and conducted a TCP study for the Project area (Lally and Camuso 2011).

Locations of all previously recorded prehistoric and historic resources, including isolated finds, and of previously conducted cultural resource investigations within one mile of one or more of the alternative route segment centerlines were entered into a GIS database. Over 800 cultural resources have been previously recorded. Only 112 of these are located within 250 feet of the centerlines. The DAHP WISAARD database also includes buffers of various sizes around most archaeological sites. For this analysis it is recognized that sites recorded within 750 feet of the centerline may have buffers that extend to within 250 feet or even 75 feet of the centerlines, but these buffers are not addressed in the analysis for this EIS. It is acknowledged that:

- Site boundaries are sometimes not well defined;
- Site data may change as nearby projects increase the number of known sites in the Project vicinity;
- The Yakama Nation Cultural Resources Program is currently conducting cultural resource surveys on federal land and will survey private land where permission is granted, so that more accurate data on site number, site boundaries, site types, and site significance will be available for the Final EIS.

Also, the record search identified 50 cultural resource surveys that have been conducted within one mile of one or more of the alternative route segment centerlines. Of these, 14 surveys have been conducted within 250 feet and portions of 13 cultural resource surveys have been conducted within a 75 feet of either side of the alternative centerlines. Overall, the percentage of land previously surveyed within 250 feet of the centerlines is approximately four percent, so hundreds of undiscovered cultural resources may exist in the Project vicinity.

3.11.2 Cultural History / Regional Overview

Prehistoric Period

The following summary of the prehistoric occupation of the Columbia Plateau cultural region is based on a chronology developed by Ames (2000). Ames identifies three major occupation periods (I, II, and III), each containing sub-phases. Therefore, this summary is intended to reflect the general cultural trends that occurred during the three periods over the last 13,000 years.

Period I (13,000 to 6,500 years ago)

Ames (2000) divides the earliest period in the chronological sequence into two phases: Windust and Vantage. The Windust phase extended from approximately 13,000 to 9,000 years ago and is characterized primarily by the presence of stemmed or shouldered projectile points, large knives, edge-ground cobbles, and simple, generalized stone tools. Upland environments were heavily relied upon by early Native Americans with a secondary focus on river habitats, where seasonally available resources were exploited. The Windust phase is characterized by a subsistence strategy that included hunting large mammals, such as bison, elk, and deer; salmon fishing; and the gathering of plants and aquatic foods (Cressman 1960; Chatters 1986). Caves, rockshelters, and open areas were all used for habitation.

During the Vantage phase (9,000 to 6,500 years ago) foraging similar subsistence pattern continued across the Columbia Plateau (Galm et al. 1981). The addition of certain projectile point types and an increase in the frequency of grinding and pounding tools in the later Vantage phase suggest there may have been subtle adaptive changes to the diet (Galm et al. 1981). Subsistence adaptations included hunting both large and small mammals such as elk, deer, antelope, rabbit, beaver, and perhaps bison. Salmon fishing may have increased in importance over time during this phase, as indicated by net weights and salmon bones (DePuydt 1990). Tool assemblages of the Vantage phase include lanceolate and other projectile points, scrapers, atlatl weights, needles, cobble tools, leaf-shaped and ovate knives, manos, mortars, bone awls and needles, and *Olivella* beads (Nelson 1969; Galm et al. 1981).

Period II (ca. 6,500 to 3,900 years ago)
Ames (2000) suggests that in some portions of the southern Plateau, Period II sites differ little from Period I sites, but in other areas, there are marked differences. Artifact assemblages and settlement patterns show a marked transition during the Period II Frenchman Springs phase (Rice 1968). The Frenchman Springs phase is characterized by a variety of projectile points, knives, scrapers, and bone and antler tools, and also includes pithouses. About 5,200 years ago, the early appearance of pithouses indicates a less nomadic lifestyle and the repeated re-occupation of specific locations for salmon harvesting (Ames et al. 1998; Chatters and Pokotylo 1998). Hunting of deer, antelope, elk, mountain sheep, and small mammals was common. Storage pits within structures and rockshelters often contain remains of fish, deer, sheep, antelope, roots, and freshwater mussels (Swanson 1962; Nelson 1969). An increase of groundstone and cobble tools suggests that upland plant resources may have taken on higher priority than in Period I.

Period III (3,900 to 300 years ago)
Period III, also called the Cayuse phase, dates from around 3,900 years ago until the first documented appearance of the horse in 1720 A.D. The Cayuse phase is divided into early and late sub-phases based in part on the adoption of the bow and arrow and an increase in the Native American population (Leonhardy and Rice 1970; Nelson 1969; Galm et al. 1981). Nelson (1969) notes a marked increase in the size and density of archaeological sites. More permanent villages and a riverine-oriented subsistence economy became increasingly apparent at the beginning of Period III. By 1000 A.D., ethnographically-documented lifeways that included large winter villages and seasonal rounds established to exploit salmon runs and plants were in place in the south-central Columbia Plateau (Adams and Ozbun 2007; Aikens 1993; Ames et al. 1998). Subsistence is linked to intensive fishing, upland root gathering and hunting (Ray 1933; Nelson 1969; Galm et al. 1981; Schalk 1982). In the winter, people inhabited pithouse or longhouse clusters in riverine or canyon environments, dispersing into small foraging groups in the spring to access root grounds, hunting areas, and fishing camps. Semi-subterranean pithouses and larger longhouses were the precursors to the surface communal longhouses later documented by European observers. Fishing was the primary summer and early fall activity, with berry gathering and hunting also conducted in the fall. Fish, large game, and root crops were stored for consumption during the winter (Ray 1933, 1939; Nelson 1969).This was a time of increased social complexity that involved expanded trade and interaction networks (Galm 1994), indicated by the presence at archaeological sites of marine shell beads and other ornaments. Small arrow points dominate stone tool assemblages (Adams and Ozbun 2007; Aikens 1993; Ames et al. 1998).

Historic Period

The historic period in the Pacific Northwest begins with the first regular contact between Euroamericans and the Native American population. Within the general Project area, a number of historic themes occur including: exploration, settlement, irrigation, agriculture, the modern military presence, and hydropower development.

Exploration

The first widely recognized contact between the native Indian groups and Euroamericans occurred when the Lewis and Clark Expedition passed through the region in 1805 and 1806, officially opening the Pacific Northwest to wide-spread fur trading. During the next 20 years, both Canadian and American fur companies established trading forts and posts from what is now the Canadian-United States border south to the Columbia River. In 1818, a treaty between Canada and the United States declared that neither country owned true title to the land on which the trading forts were built, but rather each country had the right to entry and occupation. This held true until the Treaty of 1846 established the 49th parallel defining the boundary between Canada and the United States. After the boundary was drawn, significant Euroamerican settlement began to occur in the Columbia Basin, first encouraged by the continuing fur trade and later by opportunities for agricultural development (Bennett 1979).

Ethnography

Numerous Indian groups have inhabited the study area, including the Yakama, Wanapum, Kittitas, and other Mid-Columbian groups. The Yakama and neighboring groups were originally made up of small, politically autonomous, yet closely related, bands. These bands lived in permanent winter villages located on major water courses and streams and in upland village sites during spring and summer while gathering seasonally available resources. The villages were essentially autonomous, although each group as a whole shared a common culture, maintained inter-village kinship ties, shared subsistence resources, and were engaged in frequent social interaction with one another (Ray 1939; Schuster 1998).

The modern day descendants of the tribes whose traditional territory spans the study area are the Yakama andWanapum. The Yakama are members of the federally recognized Confederated Tribes and Bands of the Yakama Nation. The Wanapum Band of Indians, although not a federally recognized group, continues to live and work in the study area. A portion of the study area is also within the traditional use area of the Sinkiuse or Moses Columbia, members of the Confederated Tribes of the Colville Reservation.

During the early 19th century, as Euro-American settlement expanded, conflicts became more frequent with Native Americans. Demand for land continued to increase and in 1855 the Washington Territorial Governor, Isaac Stevens organized a council in Walla Walla with the primary purpose of extinguishing Native American rights to lands in eastern Washington.

Native Americans in attendance, presumed to be representatives for their respective tribes, signed treaties under pressure effectively ceding half of eastern Washington to the Federal government in exchange for reservation lands and retention of rights for fishing, hunting, and gathering. The study area is within lands ceded in the 1855 Treaty with the Yakama.

Settlement, Irrigation, and Agriculture

Although settlement was occurring in the region on the eastern side of the Project area, it was somewhat slower than to the west, largely due to environmental constraints. A few ranchers claimed bunchgrass rangelands north of the Columbia River and some farmers settled in the fertile river bottoms; however, most of Grant County remained sparsely populated from the late 1850s until around the turn of the twentieth century. The area was characterized by a dry climate and a shrub-steppe ecosystem suitable for cattle ranching and little else. Lacking a substantial irrigation system, the Columbia River bottom was the only area that could be farmed with success.

It was not until the inception of the Columbia Basin Reclamation Project that significant strides were made to irrigate Grant County. The cornerstone of the Project was the Grand Coulee Dam, constructed between 1933 and 1942. Hydropower produced by the dam was used to pump water from the reservoir into a complex network of irrigation canals. By the 1960s, almost 20 percent of all of the irrigated land in Washington State was located in Grant County and a full 60 percent of its land was used for farming operations (Flom 2006).

On the western side of the Project area in what would become Yakima County, settlement was largely dictated by the arrival of the Northern Pacific Railroad and the subsequent development of irrigation throughout the Yakima Valley. One of these early irrigation projects was engineered by Walter Granger in 1889. Hired by the Northern Pacific Railroad, Granger organized and managed the Washington Irrigation Company and the Yakima Canal and Land Company. Granger was tasked with building the Sunnyside Canal to divert the waters of the Yakima River. This was the largest canal in the Northwest when water was turned into the first 25 miles in 1892 (Becker 2006; Owens 2005).

In 1905, the United States Reclamation Service authorized the development of the Yakima Project and took over the operation of the Sunnyside Project and purchased many of the smaller canals associated with it. The Reclamation Service also began construction on new canals and three divisions, the Roza, the Tieton, and the Storage Units, a year later. The Yakima Project was one of the first and largest efforts undertaken by Reclamation and today nearly 2,100 miles of its irrigation canals supply the Yakima Valley (Becker 2006; Owens 2005; Reclamation 2011).

The extensive irrigation system jump-started the agricultural industry in the western part of the Project area. Although small-scale family farms and orchards were producing some fruit and vegetables for market during the late nineteenth century, it was the Yakima Project that allowed farming to evolve into a full-blown agricultural industry. Crops included grain and hay, potatoes, onions, beets, and several types of fruit. Early orchards consisted of a variety of fruit trees including apples, cherries, peaches, pears, and plums, but by 1910 apple orchards dominated the Yakima and Kittitas Valley landscapes (Miller and Highsmith 1949).

Military Presence

The most significant modern military buildup in the region occurred during and just after World War II with the construction of the Yakima Anti-Aircraft Artillery Range and Hanford Works Atomic Energy Commission (AEC) Reservation. In 1951, the army purchased 261,000 acres that would become the home of the Yakima Firing Center (YFC). The mission of the center included both reserve training and testing of field artillery throughout the 1950s and 1960s. In 1992, the military expanded the boundaries of the YFC again when it acquired an additional 62,000 acres to the north bringing the total acreage to 327,000 acres, or roughly 511 square miles (Morey 2008). Today the range is known as the JBLM YTC and is used for weapons delivery training including, tank, artillery, and infantry gunnery (GlobalSecurity.org 2011).

The Hanford Works AEC Reservation was built in stages between 1943 and 1982. In 1943, the Army acquired a 670-square mile area upstream from the confluence of the Columbia and Yakima rivers to construct a large nuclear reactor complex. DuPont was contracted to construct the reactors and the first plutonium was delivered to Los Alamos, New Mexico in 1945, providing the fuel for the Trinity test and the atomic bombing of Nagasaki, Japan. During the Korean War and the Cold War, Hanford continued to develop its nuclear capabilities. Increased plutonium production resulted in increased radioactive waste in million gallon underground tanks at the reservation. The last operating Hanford reactor, N Reactor, was closed in 2009 and clean up of radioactive waste continues today (DOE 2009).

<u>Hydropower Development</u>
In October 1954, the Federal Power Commission, now the Federal Energy Regulatory Commission, issued a permit to the Grant County PUD to begin construction on the Priest Rapids Project. The project was to include the construction of two dams on the Columbia River within the project area; Priest Rapids Dam and Wanapum Dam.

Priest Rapids Dam was the first to be constructed and is the slightly larger of the two. Construction on the dam began in July 1956, 24 miles south of Vantage, Washington and 200 miles downstream from Grand Coulee Dam, the largest hydropower producer in the United States (Reclamation 2010; Grant County PUD n.d.a). Power generation from the dam began in October 1959.

Construction on Wanapum Dam began in 1959 six miles south of Vantage. Commercial power generation began in July 1963 (Grant County PUD n.d.b).

3.11.3 Section 106 Compliance

To ensure compliance with Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 Code of Federal Regulations (C.F.R.) 800, Pacific Power will implement stipulations of a Programmatic Agreement (PA) prepared and signed by the BLM, the lead federal agency for Section 106 compliance, JBLM YTC, other federal agencies, Washington State Historic Preservation Officer (SHPO), and other parties. The PA will define the Area of Potential Effects (APE); procedures for identifying cultural resources within the APE; evaluating their significance; assessing effects; avoiding or mitigating adverse effects; emergency discoveries; reporting; Native American consultation; and other topics.

Before construction, Pacific Power would arrange for an intensive pedestrian cultural resource survey on all federal and state lands and on private lands where permission of the land owner has been granted prior to survey. Survey would be conducted within all areas of possible physical disturbance within the APE of the selected alternative following BLM manual guidelines. The APE for the undertaking includes all involved federal, state, and private lands and will include:

- The transmission line right-of-way (ROW) along the centerline;
- Any existing unpaved access roads/existing roads which may require improvement and new roads;
- Staging areas, laydown areas, pulling and tensioning areas, and any other temporary use areas; and
- Geotechnical drilling boring locations and new or improved access roads to the drill sites.

APE dimensions will be determined in by the BLM and appropriate land managing agencies and the APE for assessing visual effects on cultural resources will be land within a specific distance of the transmission line as determined by the parties to the PA.

The BLM, in consultation with other parties to the PA, will develop and implement specific mitigation measures to mitigate any adverse effects. These may include Project modifications to avoid adverse impacts, monitoring of construction activities and data recovery studies.

3.11.4 Route Segment or Zone-Specific Considerations

For the purpose of this EIS, the study area for the cultural resource analysis included both a 150-foot wide corridor (75 feet to each side of the alternative route segment centerlines) and a 500-foot wide corridor (250 feet to either side of the alternative route segment centerlines). It is anticipated that physical impacts to cultural resources would be limited primarily to the 150-foot corridor because this corridor would include the structures and most of the access roads. However, because of the limited number of previously recorded cultural resources and limited amount of previous survey within the narrower corridor, the 500-foot corridor is used to provide a better picture of the range and density of cultural resources that could exist within the unsurveyed portions of the 150-foot corridor.

The number and types of cultural resources were documented and the previously surveyed acreage within the corridors was calculated for each of the three zones and the route segments within the zones (Table 3.11-1). Also, the TCP report was reviewed to determine if any resources of particular concern to Native Americans were located within the corridors.

3.11.4.1 Zone 1 Overview

This zone includes an area from the Pomona Heights substation to a point east of Mieras Road and includes Route Segments 1a, 1b, and 1c.

In Zone 1 there are a total of 505 acres within the 150-foot corridor, and 1,691 acres within the 500-foot corridor. According to DAHP records, none of this acreage has been previously surveyed for cultural resources (Table 3.11-1).

There are no previously documented cultural resources within the 150-foot or 500-foot corridors of Route Segments 1a, 1b, or 1c (Tables 3.11-2 and 3.11-3). Also, there are no identified TCPs within either corridor for any of the three route segments. A few additional cultural resources occur within 750 feet of the centerlines. While DAHP-defined buffers may extend into the corridors, these buffers are not included in the analysis. One TCP is located within 3.0 miles of Route Segment 1a. Six TCPs are located within 5.0 or more miles from Route Segment 1c.

Route Segment 1a (Agency Preferred Alternative)
There are 41 acres within the 150-foot corridor and 139 acres within the 500-foot corridor of Route Segment 1a. None of this acreage has been previously surveyed for cultural resources (Table 3.11-1).

There are no previously recorded cultural resources or identified TCPs within the 150-foot or 500-foot corridors (Tables 3.11-2 and 3.11-3). One TCP is located within 3.0 miles of Route Segment 1a.

Route Segment 1b (Agency Preferred Alternative)
A total of 229 acres are within the 150 foot corridor and 764 acres are within the 500-foot corridor of Route Segment 1b. None of this acreage has been previously surveyed for cultural resources (Table 3.11-1).

There are no previously documented cultural resources or identified TCPs within either the 150-foot or 500-foot corridors of Route Segment 1b (Tables 3.11-2 and 3.11-3). One TCP is located 3.0 miles from Route Segment 1c. Five additional TCPs are located within 5.0 or more miles from Route Segment 1c.

Route Segment 1c
There are 236 acres in the 150-foot corridor of Route Segment 1c and 788 acres in the 500-foot corridor. None of the acreage has been surveyed for cultural resources (Table 3.11-1).

There are no previously recorded cultural resources or identified TCPs within either the 150-foot corridor or the 500-foot corridor of Route Segment 1c (Tables 3.11-2 and 3.11-3).

TABLE 3.11-1 CULTURAL RESOURCE SURVEY COVERAGE BY ALTERNATIVE ROUTE SEGMENT

ROUTE SEGMENT	LENGTH (MILES)	150-FOOT CORRIDOR				500-FOOT CORRIDOR			
		TOTAL ACRES	ACRES UNDER WATER	SURVEYED ACRES	PERCENTAGE OF DRY LAND SURVEYED	TOTAL ACRES	ACRES UNDER WATER	SURVEYED ACRES	PERCENTAGE OF DRY LAND SURVEYED
1a	2.2	41	0	0	0	139	0	0	0
1b	12.5	229	0	0	0	64	0	0	0
1c	12.9	236	0	0	0	780	0	0	0
Zone 1 Total		505				1,691	0	0	0
2a	1.0	18	0	0	0	63	0	0	0
2b	16.4	298	0	1	0.3	995	0	5	0.5
2c	18.1	330	0	0	0	1,102	0	0	0
2d	7.0	128	0	5	3.9	431	0	14	3.2
Zone 2 Total		774	0	6	0.8	2,592	0	19	0.7
3a	0.1	3	0	3	100.0	10	0	10	100.0
3b	21.7	396	15	47	12.3	1,322	177	157	13.7
3c	25.4	459	9	29	6.4	1,532	52	95	6.4
Zone 3 Total		858	24	78	9.4	2,867	229	262	9.9
Project Area Total		**2,137**	**24**	**84**	**4**	**7,150**	**229**	**281**	**4.1**

3.11.4.2 Zone 2 Overview

This zone includes an area south of the JBLM YTC boundary roughly to SR 24 and extends east to the Columbia River. Zone 2 includes Route Segments 2a, 2b, 2c, and 2d. There are a total of 774 acres within the 150-foot corridor and 2,592 acres within the 500-foot corridor in Zone 2. Of these, six acres (0.8 percent) in the 150-foot corridor and 19 acres (0.7 percent), in the 500-foot corridor have been previously surveyed for cultural resources (Table 3.11-1).

One cultural resource recorded elsewhere, the Hanford Branch of the former Chicago, Milwaukee, St. Paul & Pacific Railroad (C, M, SP & P), also occurs within the 150-foot corridor of any of the route segments in Zone 2. The abandoned railroad grade is near the Route Segment 2d centerline along the edge of the Columbia River. The railroad grade and a prehistoric lithic scatter are located within 500 feet of Zone 2 route segments. The lithic scatter is within the 500-foot corridor of Route Segment 2c (Tables 3.11-2 and 3.11-3). A few additional cultural resources occur within 750 feet of the centerlines. While DAHP-defined buffers may extend into the corridors, these buffers are not included in the analysis. One TCP has been identified within the 150-foot corridor in Route Segment 2d. One TCP is located within 5.0 miles from Route Segment 2a.

Route Segment 2a (Agency Preferred Alternative)
Along Alternative Route Segment 2a a total of 18 acres are located within the 150-foot corridor and 63 acres are within the 500-foot corridor. None of these acres have been surveyed (Table 3.11-1).

No cultural resources have been documented or TCPs identified within either of the Route Segment 2a corridors (Tables 3.11-2 and 3.11-3). One TCP is located within 5.0 miles from Route Segment 2a.

Route Segment 2b
There are 298 acres within the 150-foot corridor of Route Segment 2b. Of this total, only one acre (0.3 percent) has been previously surveyed for cultural resources. A total of 995 acres exists within the 500-foot corridor. Only five acres (0.5 percent) in this corridor have been surveyed (Table 3.11-1).

No cultural resources have been documented and no TCPs have been identified within either the 150-foot or 500-foot Route Segment 2b corridors (Tables 3.11-2 and 3.11-3).

Route Segment 2c (Agency Preferred Alternative)
A total of 330 acres of land exist within the 150-foot corridor of Route Segment 2c and 1,102 acres exist within the 500-foot corridor. None have been previously surveyed for cultural resources (Table 3.11-1).

No cultural resources have been previously recorded within the 150-foot corridor of Route Segment 2c. One prehistoric lithic scatter has been documented within the 500-foot corridor. This site has not been evaluated for eligibility for listing in the National Register (Tables 3.11-2 and 3.11-3). No TCPs have been documented within the Route Segment 2c corridors.

Route Segment 2d (Agency Preferred Alternative)
Within the 150-foot corridor of Route Segment 2d there are 128 acres of land of which five acres (3.9 percent) have been previously surveyed for cultural resources. A total of 431 acres of non-inundated dry land exists within the 500-foot corridor; 14 acres (3.2 percent) have been previously surveyed (Table 3.11-1).

One cultural resource previously recorded elsewhere, the Hanford Grade of the former C, M, SP & P Railroad, also occurs within the 150-foot corridor or 500-foot corridor along the Route Segment 2d centerline at the Columbia River. This portion of the Hanford Grade has not been evaluated for National

Register eligibility (Tables 3.11-2 and 3.11-3). A portion of the Route Segment 2d corridor is located within an identified TCP.

3.11.4.3 Zone 3 Overview

This zone includes the old privately owned C, M, SP & P Railroad ROW on the west side of the Columbia River and a large area east of the Columbia River in Grant County that includes N Road, the Saddle Mountains and the Vantage substation. This zone includes Route Segments 3a, 3b, and 3c.

Zone 3 has 858 acres within the 150-foot corridor, 834 of which are above water. Archaeologists have previously surveyed 78 acres (9.4 percent) for cultural resources. There are 2,867 acres within the 500-foot corridor, of which 2,638 are dry land. Of these, 262 acres (9.9 percent) have been previously surveyed for cultural resources (Table 3.11-1).

Within the 150-foot corridor of Zone 3, there are 60 previously recorded cultural resources and there are 115 within the 500-foot corridor. These include prehistoric lithic scatters, rock cairns and alignments, talus pits, pictographs, rockshelters, the Wa Pai Xie Archaeological District, historic trash scatters, sections of the Hanford Grade of the C, M, SP & P Railroad, railroad construction camps, Vantage Substation, the Vantage to Columbia #1 Transmission Line, and the Midway to Vantage #1 Transmission Line (Tables 3.11-2 and 3.11-3). A few additional cultural resources occur within 750 feet of the centerlines. While DAHP-defined buffers may extend into the corridors, these buffers are not included in the analysis.

A TCP study identified much of Route Segment 3b and a portion of Route Segment 3c as being of particular concern to Native Americans. Two TCPs are located within 2.0 and 3.0 miles respectively from Route Segment 3a. One TCP is located within the 150-foot corridor in Route Segment 3b and four TCPs are located within the 150-foot corridor in Route Segment 3c.

Route Segment 3a (Agency Preferred Alternative)
Alternative Route Segment 3a is a very short segment (0.1 mile) that facilitates the interconnection of the transmission line into the Vantage substation and extends west from the 3a-3b-3c route node.

All of the 150-foot and 500-foot corridors along this very short segment have been surveyed for cultural resources (Table 3.11-1).

Two archaeological resources have been previously documented within the 150-foot corridor of Route Segment 3a, and the same two are the only resources found within the 500-foot corridor. These resources are prehistoric lithic scatters, of which one is not eligible and the other unevaluated for eligibility for listing in the National Register (Tables 3.11-2 and 3.11-3). No TCPs have been identified within the 150-foot or 500-foot corridors. Two TCPs are located within 2.0 and 3.0 miles respectively from Route Segment 3a.

One architectural resource, the Vantage Substation, has been recorded within the 150- foot corridor of segment 3a. Three architectural resources, the Vantage Substation, the Midway to Vantage #1 Transmission Line, and the Vantage to Columbia #1 Transmission Line, are within the 500-foot corridor. All of the architectural resources have been determined eligible to the National Register by the Washington DAHP.

Route Segment 3b
There are a total of 396 acres within the 150-foot corridor of Route Segment 3b. Of these, 15 acres are underwater leaving 381 acres of dry land. A total of 47 acres (12.3 percent) have been surveyed within

the 150-foot corridor. Within the 500-foot corridor there are 1,322 acres. A total of 177 of these acres are underwater, leaving 1,145 acres of dry land. Of these, 157 acres (13.7 percent) have been previously surveyed by archaeologists (Table 3.11-1).

There are 44 documented archaeological resources within the 150-foot corridor. These include the prehistoric Wa Pai Xie Archaeological District, 25 prehistoric archaeological sites, seven historic archaeological sites, eight archaeological sites with evidence of both prehistoric and historic use, and three prehistoric isolated finds (usually three or fewer artifacts). These resources consist of lithic scatters, cairns and rock features, pictographs, rockshelters, talus pits, historic trash scatters, the Hanford Grade of the C, M, SP & P Railroad, railroad camps, irrigation features, and the remains of a ranch. Two of the resources (the archaeological district and a site with pictographs) have been determined eligible to the National Register by the Washington DAHP. Five resources, including the isolated finds, are not eligible. Thirty-seven resources have not been evaluated for National Register eligibility (Table 3.11-2).

There are no architectural resources within the 150-foot corridor of Route Segment 3b.

Eighty-one (81) archaeological resources, including the 44 resources mentioned above, are within the 500-foot corridor of Route Segment 3b. These sites include the archaeological district, 47 prehistoric archaeological sites, 12 historic archaeological sites, 11 archaeological sites with evidence of both prehistoric and historic use, eight prehistoric isolated finds, and two historic isolated finds. The archaeological district and a site with pictographs and rockshelters have been determined eligible for listing in the National Register (Table 3.11-3). Ten resources, mostly isolated finds, are not eligible. Sixty-nine cultural resources have not been evaluated for National Register eligibility. One TCP is located within the 150-foot corridor in Route Segment 3b.

There is one architectural resource within the 500-foot corridor of Route Segment 3b. The Midway to Vantage #1 Transmission Line has been determined eligible to the National Register by the Washington DAHP.

Route Segment 3c (Agency Preferred Alternative)
There are 459 acres within the 150-foot corridor of Route Segment 3c. Nine acres are underwater leaving 450 acres of dry land. A total of 29 of these acres (6.4 percent) have been surveyed for cultural resources. A total of 1,532 acres are within the 500-foot corridor, of which 52 acres are underwater. Of the 1,480 acres of dry land, 95 acres (6.4 percent) have been surveyed for cultural resources (Table 3.11-1).

There are 11 archaeological resources within the 150-foot corridor. Seven are prehistoric archaeological sites, one is a historic archaeological site, one is an archaeological site used both prehistorically and historically, one is a prehistoric isolated find, and one is a historic isolated find. Prehistoric sites consist of lithic scatters, cairns, and talus pits. The historic resource is a segment of the Hanford Grade of the C, M, SP & P Railroad. Three resources are not eligible, and eight are unevaluated (Table 3.11-2).

There is one architectural resource within the 150-foot corridor. The Midway to Vantage #1 Transmission Line has been determined eligible to the National Register by the Washington DAHP.

There are 29 archaeological resources within the 500-foot corridor. These include 13 prehistoric archaeological sites, two historic archaeological sites, three archaeological sites with evidence of both prehistoric and historic use, nine prehistoric isolated finds, and two historic isolated finds. Prehistoric sites consist of lithic scatters, cairns, and talus pits. The historic resources include a trash scatter and a segment of the Hanford Grade of the C, M, SP & P Railroad. Twelve resources, mostly isolated finds, are not eligible, and 17 are unevaluated for National Register eligibility (Table 3.11-3). Four TCPs are located within the 150-foot corridor in Route Segment 3c.

There is one architectural resource within the 500-foot corridor of Route Segment 3c, the Midway to Vantage #1 Transmission Line. It has been determined eligible to the National Register by the Washington DAHP.

3.11.4.4 Native American Concerns

Traditional Cultural Properties

The Yakama Nation Cultural Resource Program (YNCRP), under contract with Pacific Power, conducted a TCP study for the Project area (Lally and Camuso 2011). The TCP study is complete and the results are currently under review.

Based on this analysis, concern was expressed primarily about Route Segment 3b, which would pass near Wanapum Village at Priest Rapids Dam and other resources of concern to the Yakama and Wanapum. The study also identifies concerns with a portion of Route Segment 3c crossing the Saddle Mountains and Lower Crab Creek.

YNCRP staff will conduct intensive cultural resource surveys of the APE. During that time, additional communication with tribal Cultural Specialists will be undertaken to determine the humanistic value of sites and to assist with site evaluations.

TABLE 3.11-2 CULTURAL RESOURCES WITHIN 150-FOOT CORRIDORS BY ALTERNATIVE ROUTE SEGMENT**

ALTERNATIVE ROUTE SEGMENT	TOTAL CULTURAL RESOURCES	RESOURCE TYPE				NATIONAL REGISTER STATUS*		
		DISTRICTS	ARCHAEOLOGICAL SITES	ISOLATED FINDS	ARCHITECTURAL RESOURCE	DETERMINED ELIGIBLE	NOT ELIGIBLE	UNEVALUATED
1a								
1b								
1c								
2a								
2b								
2c								
2d	1		1					1
3a	3		2		1	1	1	1
3b	44	1	40	3		2	5	37
3c	12		9	2	1	1	3	8

*National Register status determined by Washington DAHP
** Excludes cultural resources with only DAHP buffers extending into the corridors

TABLE 3.11-3 CULTURAL RESOURCES WITHIN 500-FOOT CORRIDOR BY ALTERNATIVE ROUTE SEGMENT**

ALTERNATIVE ROUTE SEGMENT	TOTAL CULTURAL RESOURCES	RESOURCE TYPE				NATIONAL REGISTER STATUS*		
		DISTRICTS	ARCHAEOLOGICAL SITES	ISOLATED FINDS	ARCHITECTURAL RESOURCE	DETERMINED ELIGIBLE	NOT ELIGIBLE	UNEVALUATED
1a								
1b								
1c								
2a								
2b								
2c	1		1					1
2d	1		1					1
3a	5		2		3	3	1	1
3b	82	1	70	10	1	3	10	69
3c	30		18	11	1	1	12	17

**National Register status determined by Washington DAHP*
*** Excludes cultural resources with only DAHP buffers extending into the corridors*

Native American Rights and Interests

Native American people have occupied the region for thousands of years utilizing lands in the area for hunting, fishing, plant gathering, trade and exchange, and other cultural, social and religious activities. Descendants of the first inhabitants continue to utilize the public lands and resources in their traditional use areas.

Federally recognized Tribes retain rights and/ or interests in public lands through treaties, Executive Orders and/or federal statutes. Treaty rights are pre-existing rights specifically reserved (retained) by Tribes in the treaty or agreement between the Tribe and the federal government. Hunting, fishing, and gathering of roots and berries in usual and accustomed places, and grazing on open and unclaimed lands are examples of specific rights reserved by treaty or other legal authority. The federal agency has a trust obligation to consult with Tribes to identify and consider potential impacts of plans, projects, activities or other actions that may adversely affect reserved tribal rights, resources, and other tribal interests.

The BLM, as the federal lead agency for the proposed right of way, is responsible for ensuring meaningful consultation and coordination is conducted with Tribes on a government to government basis. The proposed Project is located within the lands ceded by the Treaty of 1855 with the Confederated Tribes and Bands of the Yakama Nation and is within the traditional use areas of the Yakama, Wanapum Band of Indians, and the Columbia Salish. Issues and concerns to be considered include treaty rights and resources, sacred sites, traditional uses including areas of traditional cultural and religious importance and any other areas that may affect tribal interests.

Maintaining healthy habitats for fish and wildlife and access to locations of traditional procurement activities are essential to the exercise of reserved rights and tribal interests. Opportunities to exercise reserved rights and the availability of resources have been impacted by a number of factors including increased settlement and changes in land use practices including agriculture, irrigation, ranching, and resource extractive practices that continue to alter the landscape and natural habitats. The changes contribute to reductions in resource availability and access to the locations of traditional use. Decreased availability of culturally and economically important resources such as native fish, game or plant species and loss of access to areas of traditional use affect the traditional socio-cultural activities and practices essential to the exercise of reserved rights and tribal interests.

3.12 WILDLAND FIRE ECOLOGY AND MANAGEMENT

This section describes the wildland fire ecology and management issues for the Project area. For the purposes of this analysis, the Project study area was defined as a two mile corridor; one mile from either side of alternative route segment centerlines.

The analysis considered issues related to wildland fire raised during the public scoping process, which occurred during January and February of 2010 and January of 2011. Scoping comments included concerns regarding the impacts to fire management activities and aerial wildland fire suppression capabilities. Concerns were also raised regarding the potential for an increase in risk of wildland fire and a fires impact on the operation of the transmission line. These comments were considered during data collection and analysis of wildland fire ecology and management within the Project area.

3.12.1 Data Sources

The evaluation was conducted using planning documents, digital data sources and previously conducted studies. Sources reviewed included:

- Digital 2011 Incidental Fire Data: Fire History from 1987-2010 and Fire Frequency 1987-2010 from the Joint Base Lewis-McChord Yakima Training Center (JBLM YTC).
- Digital Fire Data from the Bureau of Land Management (BLM) and GeoMAC (2011), Wildland Fire Support.
- Digital Fire Return Interval and Fire Regime Condition Class data from LANDFIRE.
- Final Environmental Impact Statement (EIS) for Fort Lewis Army Growth and Force Structure Realignment, July 2010 (Army 2010).
- Spokane District Resource Management Plan (1985) and Record of Decision (1987) and the 1992 RMP amendment and Record of Decision (ROD). Sage Grouse Habitat Assessment Survey Report, August 2011.
- Noxious Weed Survey Report, August 2011.
- JBLM YTC, Integrated Wildland Fire Management Plan, June 2004.
- Federal Wildland Fire Management Policy, December 1995.
- Review and Update of the 1995 Federal Wildland Fire Management Policy, January 2001.
- Guidance for Implementation of Federal Wildland Fire Management Policy, February 2009.
- Pacific Power Fire Outage History Data 1995-present for the Union Gap-Midway 230 kilovolt (kV) and Wanapum-Pomona Heights 230 kV lines, July 2011.
- Yakima Training Center, Cultural and Natural Resource Management Plan 2002-2006. January 2002.

3.12.2 Current Conditions and Trends, Regional Overview

3.12.2.1 Fire History

Fire is a natural disturbance in big sagebrush communities; however the invasion of exotic annual grasses, such as cheatgrass, has shortened fire cycles and decreased fire sensitive shrubs. In drier Wyoming big sagebrush communities, mean fire return intervals have been estimated to span 50 to 240 years (Whisenant 1990; Baker 2006). Cheatgrass is common in the Project area, producing a fuel type that was not previously present and creating conditions where many areas now burn at intervals of five years or less (Brooks 2008). After fires occur, cheatgrass recovers rapidly, typically before native species in the area. Cheatgrass is adapted to a wide range of germination temperatures and this adaptation allows it to germinate during the winter when temperatures are too cold for the germination of most native plants (Pyke and Novak 1994). Thus, the quick recovery and fuel source formed by cheatgrass perpetuates an invasive plant/fire cycle (Brooks 2008). This increase in fire frequency quickly removes non-sprouting shrubs such as big sagebrush. Sagebrush is extremely susceptible to the effects of fire. Shrubs will die if they are partially burned or come in contact with the heat generated by wildfires for as little as 30 seconds (Britton and Clark 1985). Although rabbitbrush may initially increase with fire, it is killed when the fire-free interval decreases to 5 years or less (Whisenant 1990; Mosley et al. 1999). Continued increases in fire frequency eventually remove and exclude all perennial shrubs, grasses and forbs from the landscape, and competition from cheatgrass prevents their reestablishment. Fire History in the Project area is shown in Appendix A: Vegetation and Fire History.

Wildfires have occurred within and near the Project area, the majority of which were concentrated within the JBLM YTC boundary. Fires were largely ignited by lightning, but there are several instances of human cause fires (e.g., fireworks). Several fires occurred south of the Columbia River, near the boundaries of Zones 2 and 3. The Wautoma, Incident #243, and Weather Station fires occurred within the Hanford Reach National Monument which is located directly to the east of Zones 2 and 3. In 2009, a large fire occurred within and south of Zone 2. The Dry Creek Complex was started by lightning and burned over 48,000 acres.

The JBLM YTC is located directly to the north of Zones 1 and 2 and to the west of Zone 3. Route Segment 1b would be located just within the JBLM YTC boundary, with additional route segments paralleling portions of the western, southern and eastern boundaries. Due to the type and intensity of training that occurs at the JBLM YTC, the incidence and risk of fire is higher compared with adjacent lands and naturally occurring fire cycles. Training activities such as live fire exercises, use of tracer rounds, explosive ordnance, and some aspects of maneuver training can cause fire. However, the incidence of fire ignition and spread at the JBLM YTC has been declining since 1996 due to improvements to their fire management policy and increased support. Improvements include annual Prescribed Burn Plans, implementation of the Fire Risk Assessment, pyrotechnic restrictions during periods of high fire danger, wildland fire fighting training, and remote sensing and fire history monitoring (Nissen and Melcher 2004). In addition, JBLM YTC annually maintains over 240 miles of firebreaks to serve as a barrier to limit the potential spread of wildland fires and provide access for fire suppression crews (JBLM YTC 2002). The JBLM YTC has also enhanced their existing road network, with approximately 300 miles of roads acting as fire breaks (JBLM YTC 2002).

3.12.2.2 Fuel Factors

Fire risk associated with vegetation depends on the amount of fuel present and fuel continuity. Fuel continuity is important because it in part determines where a fire can go and how fast it travels. In shrublands with bunchgrasses and widely spaced shrubs, fire spread is limited by the patchiness of the fuel source (Brown 2000; Paysen et al. 2000). In these communities, fires tend to burn small areas and need conditions that are hotter and drier (Whisenant 1990).

Increased fire frequencies are associated with the introduction of cheatgrass. Cheatgrass has a very fine structure, tends to accumulate litter, and dries completely in early summer, thus becoming a highly flammable, often continuous fuel. Cheatgrass changes the fire regime of the sagebrush-steppe by filling in the spaces between shrubs, thereby creating a more continuous fuel source that carries wildfires to the widely spaced shrubs (Rice et al. 2008). As cheatgrass spreads in sagebrush communities, community structure shifts from a complex, shrub-dominated canopy with low fuel loads in the shrub interspaces, to one with continuous fine fuels in the shrub interspaces, thus increasing the probability of fire ignition and spread (Rice et al. 2008).

3.12.2.3 Fire Regime Groups and Fire Regime Condition Classes

Fire regimes, fuel loads, and the composition and structure of vegetation have been altered by fire exclusion, livestock grazing, logging, and widespread establishment of exotic plants (Schmidt et al. 2002). Fire Regime Groups and Fire Regime Condition Classes (FRCC) have been developed as tools that land managers can use to assess the impacts that these alterations have on ecosystems.

A natural, or historical, fire regime is a general classification describing the role fire would play across a landscape in the absence of modern human intervention, but includes the possible influence of burning by Native American groups (Menakis et al. 2004; NIFTT 2010). Fire Regime Groups are based on the average number of years between fires (also known as fire frequency or mean fire-return interval) combined with the severity (i.e. the amount vegetation replacement) of the fire and its effect on the dominant overstory vegetation (Menakis et al. 2004; NIFTT 2010). The five Fire Regime Groups are described in Table 3.12-1.

TABLE 3.12-1 FIRE REGIME GROUPS AND DESCRIPTIONS

GROUP	FREQUENCY	SEVERITY	SEVERITY DESCRIPTION
I	0 - 35 years	Low/mixed	Generally low-severity fires replacing less than 25% of the dominant overstory vegetation; can include mixed-severity fires that replace up to 75% of the overstory.
II	0 - 35 years	Replacement	High-severity fires replacing greater than 75% of the dominant overstory vegetation.
III	35 - 200 years	Mixed/low	Generally mixed severity; can also include low-severity fires.
IV	35 - 200 years	Replacement	High-severity fires.
V	200+ years	Replacement/any severity	Generally replacement-severity; can include any severity type in this frequency range.

Source: NIFTT 2010.

The majority of the Project area is within Fire Regime Group III (72 percent). Fires that fall into Group III are typically mixed-low severity fires that occur approximately every 35 to 200 years. The remaining areas fall within Fire Regime Group IV (22 percent replacement) and Fire Regime Group V (six percent replacement). Fire return intervals for Wyoming big sagebrush shrub steppe communities have been estimated to span 50 to 240 years, falling into Fire Regime Groups III, IV, and V (Whisenant 1990; Baker 2006).

The FRCC is an interagency, standardized tool to measure the degree of departure between historical and current fire regimes and vegetation structural conditions across differing vegetation types (Table 3.12-2). FRCC is an index that compares current with historical fire regimes and vegetation composition and structure to assess degree of departure on a scale from one (least departed) to three (most departed). It is important to note that FRCC is not a fire hazard metric, but instead measures ecological trends (Menakis et al. 2004; NIFTT 2010).

TABLE 3.12-2 FIRE REGIME CONDITION CLASSES

FIRE REGIME CONDITION CLASS	DESCRIPTION
FRCC 1	Ecosystems with low (<33%) departure from reference conditions and that are still within the estimated historical range of variation of a specifically defined reference period. Fire regimes are within an historical range and the risk of losing key ecosystem components is low. Vegetation attributes (species composition and structure) are intact and functioning within an historical range.

FIRE REGIME CONDITION CLASS	DESCRIPTION
FRCC 2	Ecosystems with moderate (33-66%) departure. Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components is moderate. Fire frequencies have departed from historical frequencies by one or more return intervals (either increased or decreased). This results in moderate changes to one or more of the following: fire size, intensity and severity, and landscape patterns. Vegetation attributes have been moderately altered from their historical range.
FRCC 3	Ecosystems with high (>66%) departure from reference conditions. Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by multiple return intervals. This results in dramatic changes to one or more of the following: fire size, intensity, severity, and landscape patterns. Vegetation attributes have been significantly altered from their historical range.

Sources: NIFTT 2010; Menakis et al. 2004.

The majority of the Project area is within FRCC 2 (58 percent) and FRCC 3 (21 percent). Five percent of the Project area falls under FRCC 1. The remaining 17 percent of the Project area is within the category agriculture, barren, urban and water, and were not assigned a FRCC. FRCC 2 represents ecosystems that have had moderate changes to fire size, intensity and severity, and landscape patterns. Vegetation attributes (species composition and structure) have been moderately altered from their historical range. FRCC 3 represents ecosystems that have had dramatic changes to fire size, intensity and severity, and landscape patterns. Significant alteration to vegetation attributes has occurred. Based on FRCC classifications, it appears that the Project area has experienced moderate to significant alteration from historic conditions.

3.12.2.4 Fire Risk Factors

Fuels are available in the Project area, with higher risks of fire associated with areas dominated by annual grasslands. Two of the alternative Route Segments (1b and 2b) will parallel JBLM YTC's existing fire breaks, which have been successful at reducing the spread of fires to non-JBLM YTC land.

Transmission line construction and operation activities have the potential to ignite wildland fires through sparks or heat from construction vehicles or equipment. Wildland fires have the potential to affect the operation of the Project facilities and, consequently the reliability of the transmission system in the region. Smoke and hot gases from a large fire under or near a power line can create a conducting path between conductors and the ground, initiating flashovers. Fires can also damage steel support structures and overhead conductors, and can destroy wood pole support structures.

PacifiCorp's Union Gap-Midway 230 kV line is located within Zone 2. During 1995 to present, the Union Gap-Midway 230 kV line had two instances of lighting striking transmission line structures. In July 2008, lightning struck the top of a pole and damaged it and in July 2010, lightning struck a side stack insulator. In both situations, the damage caused line outages but no fires were started. In August 2009, the Dry Creek Complex fire resulted in line outage from smoke and fire damage to two transmission line structures (DeNuccio 2011).

The construction of the transmission line has the potential to increase off-highway vehicle (OHV) usage of existing access roads and the right-of-way (ROW). New access roads, combined with new disturbances in the ROW and staging areas, has the potential for increased invasions by noxious weeds and invasive species, such as cheatgrass. The risk of wildfire increases in areas with established populations of cheatgrass and other non-native annual species. Increased use of access roads and ROWs established for the Project could lead to an increase in the number of human-caused ignitions in the Project area.

3.12.3 Current Management Considerations

Federal and state legislation applicable to wildland fire ecology and management in the Project area includes the following:

- Federal Wildland Fire Management Policy (December 1995; Review and Update 2001) addresses the role of fire as a natural disturbance and directs Federal agencies to ensure that policies are uniform and programs are cooperative and cohesive.
- Chapter 76.04 RCW and Chapter 332-24 WAC Forest Protection address the role of the Department of Natural Resources with regard to fire protection powers and duties, including declarations of forest protection zones, burning permits, closure of forest operations or forest lands, and the regulation of spark emitting equipment.

3.12.4 Route Segment or Zone-Specific Considerations

3.12.4.1 Zone 1

Route Segment 1a (Agency Preferred Alternative)
No recent fires have occurred along Route Segment 1a. Cheatgrass is present within this route segment, as well as intact shrub-steppe communities comprised of sagebrush and bunchgrasses. The majority of Route Segment 1a is classified as FRCC 2 (76 percent) and is within Fire Regime Group III (88 percent).

Route Segment 1b (Agency Preferred Alternative)
Route Segment 1b parallels an existing JBLM YTC fire break road. Several small fires have occurred within the Project area, primarily on the JBLM YTC. Vegetation along the fire break is disturbed and dominated by non-native species including cheatgrass. Vegetation along Route Segment 1b also includes a mixture of sagebrush with perennial bunchgrasses, annual grasses, and rabbitbrush. Bonneville Power Administration’s (BPA) Ellensburg-Moxee #1 115 kV line crosses the Project area. The majority of Route Segment 1b is classified as FRCC 2 (61 percent) and as FRCC 3 (30 percent). This route segment is within Fire Regime Group III (61 percent) and IV (39 percent).

Route Segment 1c
Route Segment 1c parallels Route Segment 1b for the majority of the route segment. Fire history and vegetation is the same as Route Segment 1b. BPA’s Ellensburg-Moxee #1 115 kV line crosses the Project study area. Route Segment 1c is classified as FRCC 2 (65 percent), 3 (16 percent), and 1 (13 percent). The remainder of the route is comprised of agriculture and developed land. This route segment is within Fire Regime Groups III (69 percent) and IV (31 percent).

3.12.4.2 Zone 2

Route Segment 2a (Agency Preferred Alternative)
Fire history records indicate that no recent fires have occurred along Route Segment 2a. This route is dominated by shrublands and non-native annual grasslands, with smaller amounts of sagebrush/perennial grasslands. Route Segment 2a is classified as FRCC 2 (96 percent) and agriculture (four percent). This route segment is entirely within Fire Regime Group III (100 percent).

Route Segment 2b
Several large fires have occurred along Route Segment 2b, including the Dry Creek Complex that burned over 48,000 acres in 2009. Vegetation along Route Segment 2b consists of a mix of sagebrush with perennial bunchgrasses and non-native annual grasslands. This route parallels a portion of JBLM YTC’s fire break. The majority of Route Segment 2b is classified as FRCC 2 (95 percent) and Fire Regime Group III (98 percent).

Route Segment 2c (Agency Preferred Alternative)
Two fires have occurred within the Project area along Route Segment 2c. The Dry Creek Complex fire occurred near and within the eastern end of this route. Vegetation along Route Segment 2c consists of a mix of sagebrush with perennial bunchgrasses and annual grasses. Route Segment 2c is classified as FRCC 2 (80 percent) and 3 (1 percent), the remainder of the route is comprised of agricultural land and developed areas (19 percent). The majority of this route segment is within Fire Regime Group III (99 percent).

Route Segment 2d (Agency Preferred Alternative)
The entire segment of Route Segment 2d occurs within the fire perimeter of the Dry Creek Complex fire. Route Segment 2d is comprised of primarily of perennial grasslands. Some pockets of annual grasslands and sagebrush with a perennial grass understory are also present. The majority of Route Segment 2d is classified as FRCC 2 (75 percent), with the remainder of the route comprised of FRCC 3 (21 percent), FRCC 1 (three percent) and agricultural land (two percent). This route segment is within Fire Regime Groups III (73 percent), IV (22 percent), V (two percent), II (two percent), and I (one percent).

3.12.4.3 Zone 3

Route Segment 3a (Agency Preferred Alternative)
Route Segment 3a is a short segment with no history of recent fires. Route Segment 3a has a mixture of sagebrush with perennial bunchgrasses and annual grasses. Route Segment 3a is classified as FRCC 2 (35 percent), FRCC 3 (19 percent), and developed land (46 percent). This route segment is within Fire Regime Groups IV (65 percent) and III (35 percent).

Route Segment 3b
A portion of this route burned in the late 1990s, 2004, and the 2009 Dry Creek Complex fire. In addition, the western portion of the Project area that is within the JBLM YTC has experienced an active fire history. This route segment is primarily sagebrush with a perennial grass understory, with segments of sagebrush with an understory of annual grasses and perennial grasslands. A section of this route segment also crosses basalt cliffs. Route Segment 3b is classified as FRCC 3 (37 percent), FRCC 2 (33 percent), and FRCC 1 (11 percent), with the remainder classified as agriculture and developed land (19 percent). This route segment is within Fire Regime Groups IV (42 percent), III (42 percent), and V (25 percent).

Route Segment 3c (Agency Preferred Alternative)
The Incident #243fire perimeter is just within the Project area for Route Segment 3c. The Incident #243 fire burned over 1,300 acres in 2008. Several different shrub species occur with an understory of perennial and annual grasses occur along Route Segment 3c. Additional vegetation communities present include rabbitbrush with an annual grass understory and grasslands dominated by non-native annual grasses. BPA’s Shultz-Wautoma 500 kV line and Vantage-Midway 230 kV line cross this route segment. Three additional BPA lines are within the Project area but do not intersect this route segment. Route Segment 3c is classified as FRCC 3 (33 percent), FRCC 2 (30 percent), and FRCC 1 (one percent). The remainder of the route segment is classified as agriculture and developed land (36 percent). Route Segment 3c is within Fire Regime Groups III (72 percent), IV (19 percent), and V (9 percent).

3.13 CLIMATE AND AIR QUALITY

3.13.1 Data Sources

Information regarding existing air quality in the Project area was obtained from various federal, state and local databases and websites. These sources include U.S. Environmental Protection Agency (EPA) AirExplorer Website, Washington State Department of Ecology (WDOE) Air Quality Website, Yakima Regional Clean Air Agency (YRCAA) website, and Benton County Clean Air Agency (BCAA) Website.

3.13.2 Current Conditions and Trends, Regional Overview

3.13.2.1 Climate

The Project area is located in south-central Washington generally between the Columbia River and Yakima River in south-central Washington in the Central Basin climatological region. The Region's climate is semi-arid, with cold winters and long, hot summers. It is situated in the rain shadow of the Cascade Mountains, with a low level of annual precipitation. Based on weather station data collected at Priest Rapids Dam between 1971 and 2000, the average annual temperature was 54.7 degrees Fahrenheit (˚F). The July temperature average was 77.1˚F with a range of 63.3˚F to 90.1˚F (low to high averages) and a January average of 33.0˚F and a range of 25.7˚F to 40.3˚F. Winter snowfall at Priest Rapids Dam is approximately 6.0 inches per year, and total annual precipitation during the period was 6.84 inches (NOAA 2011). The growing season averages about 150 days. During July and August, it is not unusual for four to six weeks to pass without measurable rainfall. "Chinook" winds, which produce a rapid rise in temperature, also occur in the region. A few damaging hailstorms are reported in the agricultural areas each summer (Western Regional Climate Center [WRCC] 2011). Average annual wind speed in Yakima is 7.1 miles per hour (mph). The highest average winds occur in April, with an 8.6 mph monthly average (NOAA 2011).

3.13.2.2 Air Quality

Air quality in the region is generally good. Pollution sources are primarily from the Yakima urban area, woodstoves and fireplaces, open burning, major highways (e.g., Interstate 82 [I-82], I-90), and fugitive dust created as a result of agricultural operations and unpaved road travel. Pollutants generated by rangeland fires or maneuvering activities on JBLM YTC may significantly affect regional air quality in the short term.

3.13.3 Current Management Considerations

Federal

U.S. Bureau of Land Management (BLM) IM 2008-171 – Guidance on Incorporating Climate Change into Planning and NEPA Documents
This Instruction Memorandum (IM) provides draft guidance on incorporating climate change analysis into management plans and National Environmental Policy Act (NEPA) documents.

BLM Oregon IM-2010-012
This IM provides Oregon/Washington State Office guidance on analyzing greenhouse gas emissions and addressing changing climate conditions in NEPA documents.

State and County Management

In the state of Washington, local authorities typically have oversight over air quality. Within the Project area, however, air quality is regulated by two local clean air agencies and two regional offices of the WDOE:

- Yakima Regional Clean Air Agency (YRCAA),
- Benton Clean Air Agency (BCAA),
- WDOE Eastern Regional office, and
- WDOE Central Regional Office

In the state of Washington, there are both state and national ambient air quality standards. Standards exist for the following pollutants:

- Carbon monoxide (CO)
- Lead (Pb)
- Nitrogen Dioxide (NO_2)
- Free particles <10 microns (PM_{10})
- Free particles <2.5 microns ($PM_{2.5}$)
- Total suspended particulates (TSP)
- Ozone (O_3)
- Sulfur dioxide (SO_2)

Each standard requires the pollutants be measured in one of three ways: parts per million (ppm) or parts per billion (ppb) by volume; milligrams per cubic meter of air (mg/m^3), or micrograms per cubic meter of air ($\mu g/m^3$).

Primary and secondary National Ambient Air Quality Standards (NAAQS) have been set by the EPA as required by the Clean Air Act. The Clean Air Act (CAA) allows states to adopt ambient air quality standards and other regulations as long as they are at least as stringent as federal (NAAQS) standards. Washington State has established Washington Ambient Air Quality Standards (WAAQS) that apply throughout the state. The YRCAA and BCAA apply WAAQS standards.

The WDOE has established NAAQS as state standards for all pollutants except PM10 annual average exceedence level, SO_2 annual, 24-hour, and 1-hour exceedence levels, and NO_2 annual average exceedence levels, which are more stringent. Table 3.13-1 shows the current national and state air quality standards. The EPA is considering changing the standards for ambient air quality for NO_2, SO_2, and O_3.

Secondary standards for NO_2 and SO_2 would be raised for the 1-hour averaging period to 100 ppb and 75 ppb, respectively, under the new rule proposed in July of 2011. Primary and secondary standards are proposed to be changed for O_3 under new rules published in the Federal Register on January 19, 2010. For the 8-hour averaging period, primary standards may change to 0.060 to 0.070 ppm under the new rules, and the secondary standard for O_3 would change to a cumulative, seasonal standard (e.g., annual index).

WDOE maintains air quality monitoring stations across the state to monitor pollutants. Monitoring stations in the Project region are located in Yakima, Ellensburg, Toppenish, Mesa, and Moses Lake (WDOE 2011). The Yakima monitoring station is located at 402 S 4th Avenue approximately 4 miles south the Project.

TABLE 3.13-1 NATIONAL AND STATE AMBIENT AIR QUALITY STANDARDS

POLLUTANT	AVERAGING PERIOD	NATIONAL (NAAQS)		WASHINGTON STATE (WAAQS)	NOTES
		PRIMARY	SECONDARY		
Ozone (O_3)	8-hour	0.075 parts per million (ppm)	0.075 ppm	-	1
	1-hour (Daily Maximum)	0.12 ppm	0.12 ppm	0.12 ppm (235 mg/m^3)	2
Free particles <2.5 microns ($PM_{2.5}$)	Annual (Arithmetic Mean)	15.0 µg/m^3	15.0 µg/m^3	-	3
	24-hour	35 µg/m^3	35 µg/m^3	-	4
Free particles <10 microns (PM_{10})	Annual (Arithmetic Mean)	-	-	50 µg/m^3	5
	24-hour	150 µg/m^3	150 µg/m^3	150 µg/m^3	6
Carbon monoxide (CO)	8-hour	9 ppm (10 mg/m^3)	-	9 ppm (10 mg/m^3)	7
	1-hour	35 ppm(40 mg/m^3)	-	35 ppm (40 mg/m^3)	7
Nitrogen dioxide (NO_2)	Annual (Arithmetic Mean)	0.053 ppm	0.053 ppm	0.05 ppm (100 mg/m^3)	8
	1-hour	100 ppb	-	-	9
Sulfur dioxide (SO_X)	Annual (Arithmetic Mean)	0.03 ppm	-	0.02 ppm	8
	24-hour	0.14 ppm	-	0.10 ppm	7
	3-hour	-	0.5 ppm (1300 µg/m^3)	-	7
	1-hour	-	-	0.40 ppm	7
	1-hour	-	-	0.25 ppm	10
	1-hour	75 ppb	-	-	12
Lead (Pb)	Rolling 3-month average	0.15 µg/m^3	0.15 µg/m^3	-	11
	Quarterly average	1.5 µg/m^3	1.5 µg/m^3	-	-
Total suspended particulates (TSP)	Annual (Geometric Mean)	-	-	60 µg/m^3	11
	24-hour	-	-	150 µg/m^3	7

Source: EPA 2011a; WDOE 2011.

[1] The 3-yr average of the 4th highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm.
[2] Not to be above this level on more than one day in a calendar year.
[3] The 3-year average from a community-oriented monitor is not to be above this level.
[4] The 3-year average of the annual 98th percentile for each population-oriented monitor within an area is not to be above this level.
[5] The 3-year average arithmetic mean concentrations at each monitor within an area is not to be above this level.
[6] Not to be exceeded more than once per year on average over three years (NAAQS). Not to be above this level on more than three days over three years with daily sampling (WAAQS).
[7] Not to be above this level more than once in a calendar year.
[8] Not to be above this level in a calendar year.
[9] The 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor is not to be above this level.
[10] Not to be above this level more than twice in a consecutive 7-day period.
[11] Not to be above this level.
[12] Effective August 23, 2010, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb.

Section 106 of the CAA and its amendments require that air quality be protected against impacts on visibility in areas of national or regional natural, recreational, scenic or historic value. These areas are designated as Class I areas, and are located in eight areas as identified by WDOE. The nearest Class I areas are located in the Mt. Rainier National Park and Goat Rocks Wilderness areas approximately 50 miles to the west of the Project location.

Prevention of Significant Deterioration (PSD) permits are required for construction projects that may significantly increase air pollutant emissions. The WDOE prepares PSD permits for industrial sources of air pollution. PSD applies to new major sources or major modifications at existing sources for pollutants where the area the source is located is in attainment or unclassifiable with the NAAQS. The Project is not considered a major new source of pollution, and therefore, PSD does not apply.

Areas that have experienced persistent air quality problems are designated by the EPA as nonattainment areas. The federal CAA requires additional air pollution controls in these areas. Each nonattainment area is declared for a specific pollutant; however, nonattainment areas for different pollutants may overlap each other or share common boundaries. After air monitoring shows that a nonattainment area is meeting health-based air quality standards, EPA re-designated the areas as attainment. Areas that are re-designated to attainment are called maintenance areas (WDOE 2011).

A portion of the City of Yakima is considered a carbon monoxide maintenance area, and a large area encompassing Yakima, Selah and portions of the Project area are within a particulate maintenance area. Table 3.13-2 shows Yakima City monitored ambient air quality at the 402 S 4th Ave. station for $PM_{2.5}$ and PM_{10} from 2004 to 2008. No exceedances were recorded for the 24-hour or annual averaging period between 2004 and 2008. Prior to project construction, contractors doing demolition, excavation, clearing, construction, or landscaping work must file a Dust Control Plan with the YRCAA to control fugitive dust emissions.

TABLE 3.13-2 YAKIMA CITY MONITORED AMBIENT AIR QUALITY: $PM_{2.5}$ AND PM_{10}

POLLUTANT	YEAR	24-HOUR VALUES				ANNUAL	
		# OBSERVATIONS	1ST THROUGH 4TH MAX. RANGE (HIGH-LOW) (µG/M3)	98TH PERCENTILE	# OF EXCEED	MEAN	# EXCEED
$PM_{2.5}$	2004	121	62.2-43.5	44.3	0	10.92	0
	2007	109	43.9-30.7	35.4	0	9.69	0
	2008	104	37.3-25.9	26.2	0	8.54	0
PM_{10}	2004	91	105-61	N/A	0	26	0
	2005	58	84-50	N/A	0	23	0
	2006	57	51-38	N/A	0	22	0
	2007	60	57-40	N/A	0	21	0
	2008	50	55-43	N/A	0	22	0

Source: U.S. EPA Air Data Website - Monitor Values Report-Yakima County 402 S 4th Ave, Station-Site ID 530770009 (EPA 2011b).

3.13.4 Route Segment or Zone-Specific Considerations

3.13.4.1 Zone 1 Overview

Zone 1 is located in the YRCAA administrative area.

3.13.4.2 Zone 2 Overview

Zone 2 is located in the YRCAA and BCAA administrative areas.

3.13.4.3 Zone 3 Overview

Zone 3 is located in the YRCAA, BCAA, and Central and Eastern Regional Ecology Office administrative areas.

3.13.5 Global Climate Change

BLM recognizes the importance of climate change and the potential effects it may have on the natural environment and has issued two recent IMs: IM 2008-171, "Guidance on Incorporating Climate Change into Planning and NEPA Documents" and IM OR-2010-012 (BLM 2010), "Analysis of Greenhouse Gas Emissions and Consideration of Climate Change in National Environmental Policy Act Documents." According to the BLM's IM No. 2008-171 (BLM 2008), climate change considerations should be acknowledged in EIS documents. The IM states that ongoing scientific research has identified the potential impacts of human caused greenhouse gas emissions and changes in biological carbon sequestration due to land management activities on global climate. Through complex interactions on a regional and global scale, these greenhouse gas emissions and net losses of biological carbon sinks cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into space. Although greenhouse gas levels have varied for millennia, recent industrialization and burning of fossil carbon sources have caused carbon dioxide equivalent (CO_2(e)) concentrations to increase dramatically, and are likely to contribute to overall global climatic changes. The Intergovernmental Panel on Climate Change (IPCC) recently concluded that "warming of the climate system is unequivocal" and "most of the observed increase in globally average temperatures since the mid-20th century is very likely due to the observed increase in human caused greenhouse gas concentrations" (IPCC 2007).

Ongoing scientific research has identified the potential impacts of climate changing pollutants on global climate. These pollutants are commonly called "greenhouse gases." Greenhouse gases are chemical compounds found in the earth's atmosphere that absorb and trap infrared radiation, or heat, re-radiated from the surface of the earth. The trapping and build-up of heat in the atmosphere increases the earth's temperature, warming the planet and creating a greenhouse-like effect (EIA 2009a). Anthropogenic (human) activities are increasing atmospheric concentrations to levels that could increase the earth's temperature up to 7.2˚F by the end of the twenty-first century (EPA 2009a). The principal greenhouse gases emitted onto the atmosphere through human activities are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and fluorinated gases (EPA 2010a). Of these four gases, CO_2 is the major greenhouse gas emitted (EPA 2010a; Houghton 2010). For example, CO_2 emissions resulting from the combustion of coal, oil, and gas constitute 81 percent of all U.S. greenhouse gas emissions (EIA 2009b). Carbon dioxide enters the atmosphere primarily through the burning of fossil fuels coal, natural gas and oil, and wood products, as a result of land use changes, and the manufacturing of cement. Prior to the industrial revolution, concentrations were roughly stable at 280 ppm but have increase 36 percent to 379 ppm in 2005, all of which is attributed to human activities (IPCC 2007).

Of the remaining three greenhouse gases, methane is emitted during the production and transport of fossil fuels, through intensive animal farming, and by the decay of organic waste in landfills. Methane concentrations have increased 148 percent above pre-industrial levels (EPA 2009b, 2010). Nitrous oxide is emitted during agricultural and industrial activities, and during the combustion of fossil fuels and solid waste. Nitrous oxide atmospheric levels have increase 18 percent since the beginning of industrial activities (EPA 2009b, 2010b). Fluorinated gases, hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride (SF_6), are synthetic compounds emitted through industrial processes and now are being used to replace ozone-depleting compounds such as chlorofluorocarbons in insulating foams, refrigeration, and air conditioning. Although they are emitted in small quantities, these gases have the ability to trap more heat than CO_2 and are considered High Global Warming Potential gases. Atmospheric concentrations of fluorinated gases have been increasing over the last two decades and are expected to continue (EPA 2009b, 2010b).

Global atmospheric greenhouse gas concentrations are a product of emissions and removal over time. Through the process of photosynthesis, atmospheric carbon is captured and stored as biomass in vegetation, especially forests. Soils also store carbon in the form of decomposing plant materials and constitute the largest carbon reservoir on land. The stored carbon can be released back into the atmosphere when biomass is burned (EIA 2010). In addition CO_2, N_2O, and CH_4 emissions increase in areas where soil disturbance occurs (Kessavalou et al. 1998). Models predict atmospheric concentrations of all greenhouse gases are to increase over the next century, but the extent and rate of change is difficult to predict, especially on a global scale.

The IPCC completed a comprehensive report assessing the current state of knowledge on climate change, its potential impacts and options for adaptation and mitigation (IPCC 2007). According to this report, global climate change may ultimately contribute to a rise in sea level, destruction of estuaries and coastal wetlands, and changes in regional temperature and rainfall patterns, with major implications to agriculture and coastal communities. The IPPC has suggested that the average global surface temperature could rise 1.0 to 4.5˚F in the next 50 years, with significant regional variation. The National Academy of Sciences (2006) indicated that there are uncertainties regarding how climate change may affect different regions. Computer models indicate that such increases in temperature will not be equally distributed globally, but are likely to accentuate at higher latitudes, such as in the Arctic, where the temperature increase may be more than double the global average. Also, warming during the winter months is expected to be greater than during the summer, and increases in daily minimum temperatures is more likely than increases in daily maximum temperatures. Vulnerabilities to climate change depend considerably on specific geographic and social contexts.

Several activities occur within the Project area that may generate emissions of climate changing pollutants. For example, agriculture, fires, JBLM YTC training activities, City of Yakima and recreation using combustion engines, can potentially generate CO_2 and methane. Other activities may help sequester carbon, such as managing vegetation to favor perennial grasses and increase vegetative cover, which may help build organic carbon in soils and function as “carbon sinks”.

It is difficult to discern whether global climate change is already affecting resources, let alone the area of the proposed Project. In most cases there is more information about potential or projected effects of global climate change on resources. It is important to note that projected changes are likely to occur over several decades to a century. Therefore, many of the projected changes associated with climate change may not be measurably discernible within the reasonably foreseeable future.

The CAA is a federal law that establishes regulations to control emissions from large generation sources such as power plants. The EPA has issued the Final Mandatory Reporting of Greenhouse Gases Rule that requires reporting of greenhouse gas emissions from large sources. Under the rule, suppliers of fossil fuels, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of greenhouse gases, are required to submit annual reports to the EPA (EPA 2010b). Executive Orders 13423 and 13514 require federal agencies to measure manage and reduce greenhouse gas emissions by agency defined target amounts and dates (The White House 2009). In the state of Washington, Executive Orders 07-02 and 09-05 direct state agencies to work with western states and Canadian provinces to develop a regional emissions reduction program designed to reduce greenhouse gas emissions to 1990 level by 2020 (WDOE 2010).

3.14 WATER RESOURCES

This section presents a discussion of the water resources in the Project area. The affected environment is described for surface waters, groundwater, floodplains and other sensitive water resources. For the purposes of this analysis, the Project area was defined as a two mile corridor; one mile either side of alternative route segment centerlines.

The analysis considered issues related to water resources raised during the public scoping process, which occurred during January and February of 2010 and January of 2011. Scoping comments included concerns regarding the impacts to permanent and seasonal wetlands and riparian areas. These comments were considered during data collection and analysis of water resources within the Project area.

3.14.1 Data Sources

The analysis of water resources in the Project area was conducted using planning documents, field studies and digital data sources. Sources included:

- Surface water data from the U.S. Geological Survey (USGS) National Hydrography Dataset.
- Floodplain data for Yakima and Grant Counties from the Federal Emergency Management Agency's DFIRM program dated July 22, 2010. Floodplain data for Benton and Kittitas Counties are older Q3 data dated 1998 and 1996 respectively.
- National Wetland Inventory (NWI) digital data from the U.S. Fish and Wildlife Service (USFWS).
- Digital watershed mapping from the Washington State Department of Ecology.
- Aerial imagery used in analyzing water resources consists of the National Agriculture Imagery Program (NAIP) imagery 2009.
- Digital Adopted Shoreline data was obtained from the Washington State Department of Ecology.
- Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) Cultural and Natural Resource Management Plan, January 2002.
- Final Environmental Statement (EIS) for Fort Lewis Army Growth and Force Structure Realignment, July 2010.
- Sage Grouse Habitat Assessment Report for the Vantage to Pomona Heights 230 kilovolt (kV) Transmission Line, August 2011.

3.14.2 Current Conditions and Trends, Regional Overview

3.14.2.1 Precipitation

The Project area has a steppe climate with a Mediterranean precipitation pattern. The Project area is in the rain shadow of the Cascades, resulting in a semiarid climate. Most precipitation falls as rain and averages 8 inches annually. Snowfall occurs mostly in December and January, and averages 20 to 25 inches (WRCC 2005).

3.14.2.2 Watersheds

A watershed is an area draining into a river, lake or other waterbody. The Washington State Department of Ecology (WDOE) and other state natural resource agencies have divided the state into 62 Water Resource Inventory Areas (WRIAs) to delineate the state's major watersheds. The Project area includes portions of five WRIAs including Esquatzel Coulee (WRIA 36), Lower Yakima (WRIA 37), Upper Yakima (WRIA 39), Alkali/Squilchuck (WRIA 40) and Lower Crab (WRIA 41). The WRIA boundaries are shown in Appendix A: Water Resources and Wetlands.

3.14.2.3 Water Quality

The federal Clean Water Act (CWA), adopted in 1972, requires that all states restore their waters to be "fishable and swimmable". Section 303(d) of the federal CWA requires Washington State to periodically prepare a list of all surface waters in the state for which beneficial uses of the water (drinking, recreation, aquatic habitat, and industrial use) are impaired by pollutants. These are water quality limited estuaries, lakes, and streams that fall short of state surface water quality standards, and are not expected to improve within the next two years.

The WDOE has designated two water features in the Project area as impaired. The segment of the Columbia River at Priest Rapids Lake has been listed as water quality impaired due to temperature and pesticides from unknown sources. Lower Crab Creek has been listed as water quality impaired due to pH, temperature and pesticides from unknown sources.

3.14.2.4 Shorelines (Washington State Shoreline Management Act)

Washington's Shoreline Management Act governs the use and development of Washington shorelines and creates a partnership between local and state government. The Act strives to achieve responsible shoreline use and development, environmental protection, and public access. Local governments develop programs based on the Act and state guidance, and the state ensures local programs consider statewide public interests.

The shorelines within the Project area fall under the jurisdiction of the respective counties; however, the majority of shorelines in the Project area are located on the banks of Priest Rapids Lake, and are managed by Grant County Public Utilities District (Grant County PUD). The utility's Priest Rapids Project License requires consultation with Federal Energy Regulatory Commission (FERC)-identified stakeholders to complete a Shoreline Management Plan (SMP) for the shorelines along the reservoirs created by the two dams. FERC has prepared an Environmental Assessment for Grant County PUD's proposed SMP and approval is pending. A small amount of shoreline associated with the Yakima River is also located within the Project area.

3.14.2.5 Floodplains

A floodplain is the area on the sides of a stream, river, or watercourse that is subject to periodic flooding. The extent of the floodplain is dependent on soil type, topography, and water flow characteristics. A 100-year flood is a flood stage that statistically has a one percent probability of occurring in any given year.

Flood flows are typically experienced in the Columbia River Basin during May and June as a result of the melting of the winter snowpack. Maximum flood peaks result from heavy snow accumulation and a prolonged period of intense snowmelt, occasionally augmented by heavy rain. Natural streamflow recedes during July and August and remains at relatively low levels throughout the winter (USACE 2003).

Floodplain categories in the Project area included 100-year floodplain zones (Zone A) and no flood zones (Zone X), which are outside the 100 and 500-year floodplains. Flood Insurance Risk Zone A areas are subject to inundation by the one-percent-annual-chance flood event. Appendix A: Water Resources and Wetlands shows floodplains in the Project area.

The only substantial floodplains within the Project area are those associated with the Columbia River. The 100-year floodplain along the Columbia River is relatively narrow because dams in and upstream from the Project area regulate flows. Small amounts of floodplain can also be found associated with the Yakima River, Lower Crab Creek, and Dry Creek.

3.14.2.6 Wetlands

The regulatory definition of Section 404 CWA jurisdictional wetlands according to the U.S. Environmental Agency (EPA) and U.S. Army Corps of Engineers (USACE) are "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions."

Wetlands can be vegetated or non-vegetated and are classified on the basis of their hydrology, vegetation, and substrate. Wetlands are classified according to the system proposed by Cowardin and others (Cowardin et al. 1979), which is used by the NWI to map and inventory the nation's wetlands.

Given the semi-arid nature of the Project area, wetlands are scarce. However, three primary wetland types are found in the Project area: Palustrine, Lacustrine and Riverine.

Palustrine wetlands are a grouping of the vegetated wetlands traditionally called by such names as marsh, swamp, bog, fen, and prairie, which are found throughout the United States. It also includes the small, shallow, permanent or intermittent water bodies often called ponds. Palustrine wetlands may be situated shoreward of lakes, river channels, or estuaries; on river floodplains; in isolated catchments; or on slopes. They may also occur as islands in lakes or rivers. Palustrine wetlands are the most common type of wetland found within the Project area. They are associated with agricultural ponds, persistent and ephemeral wetlands and Lower Crab Creek.

Lacustrine refers to fresh water lakes or reservoirs greater than 20 acres in size, with less than 30 percent of the surface covered by emergent vegetation. The plants found in Lacustrine wetlands will be influenced by the climate of the area. The primary Lacustrine wetlands within the Project area are associated with Priest Rapids Lake and the Columbia River. Lacustrine wetlands are also associated with Lower Crab Creek.

The Riverine System includes all wetlands and deepwater habitats contained in natural or artificial channels which, periodically or continuously, contains flowing water or which forms a connecting link between the two bodies of standing water. Upland islands or Palustrine wetlands may occur in the channel, but they are not part of the Riverine System. Within the Project area, a Riverine system is associated with Lower Crab Creek.

3.14.2.7 Perennial Streams/Creeks

The primary surface water features found within the Project area include the Columbia River in the eastern portion of the Project area and the Yakima River in the western portion. The only other perennial stream found within the Project area is Lower Crab Creek, which discharges to the Columbia River.

3.14.2.8 Intermittent Drainage Courses

With the exception of the perennial streams and rivers mentioned above, water in the Project area is scarce. Streams are generally small and intermittent. These include Hanson, Alkali Canyon, Dry, Coyote Springs, Corral Canyon, Sourdough Canyon Creeks, and Cold Creek. The remaining drainages in the Project area are ephemeral, flowing for a short time in the spring or in response to a large storm event.

3.14.2.9 Priest Rapids Hydroelectric Facility Operation

Grant County PUD owns two large hydroelectric dams on the Columbia River - Priest Rapids and Wanapum dams. These facilities, licensed together as the Priest Rapids Project, make up the second largest non-federal hydroelectric project in the country. With the ability to produce nearly 2,000 megawatts of electricity, enough to power the city of Seattle, the Priest Rapids Project's clean, renewable hydroelectricity powers Grant County and millions of homes and businesses across the Northwest.

On October 21, 1954, the Federal Power Commission (now the FERC) issued a permit to Grant County PUD authorizing the construction of the Priest Rapids Project. Priest Rapids Dam began operation in 1959 and Wanapum Dam went on-line in 1963.

Grant County PUD received a new long-term license to operate Priest Rapids and Wanapum dams in 2008. The terms of the license direct the utility to provide protection to natural and cultural resources, including constructing and operating fish hatcheries and adopting and implementing shoreline and recreation management plans.

Grant County PUD distributes the power from these two dams and other power resources at production cost through long-term contracts with 22 regional utilities in Washington, Oregon and Idaho.

3.14.2.10 Flowage Easements

A flowage easement is the right of the government to use another's land. Any easement is a right or privilege by one to use the land of another for a specific purpose. In the case of a flowage easement, this usually consists of the perpetual right, power, privilege and easement to overflow, flood and submerge the lands affected; reserving, however, to the fee owner of the lands all such rights and privileges as may be used and enjoyed without interfering with or abridging the rights granted in the flowage easement.

An owner of land is entitled to "just compensation" whenever the waters of a stream or lake are altered or impounded so as to inundate, saturate, or erode his land. This applies to lands not previously affected by natural flooding, as well as to those which have been subject to natural flooding, where water level alteration or artificial impoundment aggravates this natural flooding condition. Such alteration constitutes a "taking" of the land involved, and the taker must either purchase the affected land in fee or acquire a flowage easement.

Flowage easements associated with the operation of the Priest Rapids Hydroelectric facility and held by the Grant County PUD are located around the shoreline perimeter of the Priest Rapids Lake. Flowage easements are variously located along Route Segment 3b.

3.14.2.11 Irrigation Canals

There are many irrigation canals located within the Project area. The three most prominent canals are located in the agricultural lands in Grant County. These include the Wahluke Branch Canal, Saddle Mountain Wasteway and the Mattawa Canal, all of which are managed and operated by South Columbia Basin Irrigation District.

3.14.2.12 Wells

Drinking water supplies in the Project area are met primarily by wells that pump groundwater. Individual domestic wells tap permeable portions of a surficial sedimentary aquifer, while most municipal wells tap deeper aquifers in basalt (lava bedrock) and sedimentary interbed layers that underlay the sediments (Pacific Groundwater Group 2011).

For more than 100 years, irrigated agriculture has existed in the region, with farmers applying fertilizers and pesticides to attempt to maximize crop yields. In the past 25 to 30 years, large scale dairy operations have joined feedlots in the area, significantly increasing the amount of nitrates present. For much of the past 150 years, people have depended on the aquifers for their domestic and stock water. Up until fairly recently, the well construction techniques and health and safety protections in place on those wells were fairly rudimentary. People have often utilized the first available water resource for their water supply. The shallowest aquifers in the valleys have likely been contaminated by bacteria and nitrates and chemicals for much of that time (Dispute Resolution Center of Yakima and Kittitas Counties 2010).

Existing studies and related water quality data indicate that nitrate contamination of groundwater exist in the region and at least portions of the Project area. In some areas nitrate levels are in excess of the state drinking water maximum contaminant level (MCL) of 10 milligrams per liter (mg/L) (Washington State Department of Agriculture et al. 2009).

Under Section 1431 of the Safe Drinking Water Act, the EPA has broad authority to take action where there is a contaminant in an underground source of drinking water that may present an imminent and substantial endangerment to the health of persons. The EPA has determined that these conditions exist in the Yakima Valley because nitrate levels are above the MCLs.

3.14.3 Current Management Considerations

At the federal level, the USACE regulates wetlands and other waters of the United States including rivers and streams under the CWA. Some aspects of this authority have been delegated to the state and local governments. Washington State agencies regulate wetlands under the Hydraulic Code, State Water Pollution Control Act, SMA, and the Forest Practices Act. Local governments such as the county or city, regulate wetlands under the Growth Management Act and the Shoreline Management Act. Applicable regulations and regulatory framework are presented below.

Federal Jurisdiction

Clean Water Act
The CWA regulates discharges into waters of the United States. Several sections of the CWA apply to the Project as described below.

Section 401
Section 401 of the CWA requires that states certify compliance of federal permits and licenses with state water quality requirements. A federal permit to conduct an activity that results in discharges into waters of the United States is issued only after the affected state certifies that existing water quality standards would not be violated if the permit were issued. The WDOE would review each permit for compliance with state water quality standards.

Section 402
This section authorizes stormwater discharges under the National Pollutant Discharge Elimination System (NPDES). In Washington, the EPA has a general permit authorizing facilities to discharge stormwater from construction activities disturbing land of one acre or more into waters of the United States, in accordance with various set conditions.

Section 404
Authorization from the USACE under Section 404 is required when there is a discharge of dredge material or fill material into waters of the United States, including wetlands. A Section 404 permit would be required.

Rivers and Harbors Act
Section 10 of the Rivers and Harbors Act of 1899 regulates all work done in, or structures placed below, the ordinary high water mark of navigable waters of the United States. Pursuant to the implementing

regulations, Section 10 permits are required for electric transmission lines crossing navigable waters of the United States and, as such, would be required for this Project.

Coastal Zone Management Consistency
The Coastal Zone Management Program is authorized by the Coastal Zone Management Act of 1972 and administered as the federal level by the National Oceanic and Atmospheric Administration Office of Ocean and Coastal Resource Management, Coastal Programs Division. Management of the program is delegated to the states participating in the program. In Washington, the WDOE administers the program.

State Jurisdiction

Water Quality Certification
Applicants receiving a Section 404 permit from the USACE, a Coast Guard permit or license from the FERC, are required to obtain a Section 401 water quality certification from the WDOE. Issuance of a certification means that WDOE anticipates that the applicant's project will comply with state water quality standards and other aquatic resource protection requirements under WDOE’s authority. The 401 Certification can cover both the construction and operation of the proposed Project. Conditions of the 401 Certification become conditions of the Federal permit or license.

Hydraulic Project Approval
Any form of work that uses, diverts, obstructs, or changes the natural flow or bed of any fresh water or saltwater of the state, requires a Hydraulic Project Approval from the Washington Department of Fish and Wildlife.

Aquatic Use Authorization
Under what is commonly referred to as the Aquatic Lands Act, anyone wishing to use state-owned aquatic lands, including owners of adjacent lands, must get authorization from the Washington State Department of Natural Resources (WDNR). Aquatic lands include the beds of Puget Sound, navigable rivers, lakes, and other waters; and much of the tidelands (land covered and exposed by the tide) and shorelands of lakes and other fresh waters.

Local Jurisdiction (County/City)

Shoreline Development/Shoreline Management Act
In Washington, the Coastal Zone Management Act is carried out by the Shoreline Management Act. The Shoreline Management Act regulates most shorelines of the state including marine waters, streams and rivers (with a mean annual flow of 20 cubic feet per second or more), lakes and reservoirs or water areas of the state (larger than 20 acres), associated wetlands and portions of the flood plain. The Shoreline Management Act regulates wetlands with 200 feet of shoreline water bodies and wetlands associated with these water bodies. The Shoreline Management Act is implemented through a permit program for activities in and on the shorelines of the state. Permits are issued by local governments.

For the proposed Project, the transmission line structures located with 200 feet of the shoreline for a crossing of the Columbia River by either Route Segment 3b below the Wanapum Dam in Kittitas and Grant County or Route Segment 3c below the Priest Rapids dam in Benton and Grant County would require a Shoreline Substantial Development Permit (SDP). The permits are issued by the counties if permit applications comply with the local shoreline master program for the county and the policies and provisions of the Shoreline Management Act. The WDOE has primary responsibility to review issued permits for compliance with the shoreline master program.

Most developments that meet a specific dollar threshold are considered substantial developments and require a SDP. Under certain circumstances, local governments can allow deviations from shoreline master program requirements through variance or a Conditional Use Permit**.**

Critical Areas Ordinance
The Washington State Growth Management Act (GMA) identifies five Critical Areas in each Washington state county in accordance with RCW 36.70A.170. Critical areas include the following areas and ecosystems: (a) wetlands; (b) areas with a critical recharging effect on aquifers used for potable water; (c) fish and wildlife habitat conservation areas; (d) frequently flooded areas; and (e) geologically hazardous areas. Counties that are covered under the GMA, are required to protect Critical Areas (Washington State Department of Community, Trade and Economic Development 2003).

Floodplain Permit
If a project is located in a mapped 100-year floodplain, the local government requires that a permit be obtained prior to development.

Proposed projects are reviewed and conditions imposed on any permits issued to reduce the potential for damage from floodwater. Permits are required for any development in the floodplain.

Permitting Process
To streamline the environmental permitting process, multiple regulatory agencies joined forces to create one application that can be used to apply for more than one permit at a time. The process is known as the Joint Aquatic Resources Permit Application (JARPA). The JARPA can be used for the permits and approvals listed above with the exception of the Aquatic Use Authorization, which requires a separate application from the WDNR.

3.14.4 Route Segment or Zone-Specific Considerations

3.14.4.1 Zone 1

Route Segment 1a (Agency Preferred Alternative)
Route Segment 1a is a relatively short route segment that crosses two irrigation canals and several intermittent and/or ephemeral drainages.

Route Segment 1b (Agency Preferred Alternative)
Route Segment 1b crosses Kittitas Canyon Creek, which has an aspen grove and some riparian vegetation associated with it. Route Segment 1b also crosses several un-named intermittent or ephemeral drainages.

Route Segment 1c
Route Segment 1c parallels Route Segment 1b and crosses similar un-named intermittent or ephemeral drainages. Some riparian vegetation is present along the margins of Kittitas Canyon Creek that is crossed by Route Segment 1c.

3.14.4.2 Zone 2

Route Segment 2a (Agency Preferred Alternative)
Route Segment 2a is a short route segment that crosses Coyote Springs Creek, which has some riparian vegetation present.

Route Segment 2b
Route Segment 2b crosses several ephemeral drainages with some riparian vegetation present.

Route Segment 2c (Agency Preferred Alternative)
Route Segment 2c crosses several un-named ephemeral drainages. A portion of this route parallels but does not cross Dry Creek and its associated 100 year floodplain. At its nearest point, Dry Creek lies approximately one half mile south of Route Segment 2c.

Route Segment 2d (Agency Preferred Alternative)
Some riparian vegetation is present along Cold Creek and un-named ephemeral drainages that are crossed.

3.14.4.3 Zone 3

Route Segment 3a (Agency Preferred Alternative)
No water resources were identified along Route Segment 3a.

Route Segment 3b
Route Segment 3b parallels the Columbia River and Priest Rapids Lake for approximately 12 miles. This route segment roughly coincides with the designated shoreline and 100 year floodplain. Near its northern end, Route Segment 3b crosses the Columbia River below Wanapum Dam. This route would cross Hansen, Alkali Canyon, Corral Canyon, Cow Canyon and Sourdough Canyon Creeks as well as several un-named ephemeral drainages that are seasonally moist with little or no riparian vegetation present. Both the Columbia River and Priest Rapids Lake are Lacustrine wetland types. Some riparian vegetation is present along the portions of the Columbia River that occur within the Project area.

Flowage easements associated with the operation of the Priest Rapids Hydroelectric facility and held by the Grant County PUD are located around the shoreline perimeter of the Priest Rapids Lake. Flowage easements are variously located along alternative Route Segment 3b.

Route Segment 3c (Agency Preferred Alternative)
Route Segment 3c parallels the Columbia River below Priest Rapids dam for approximately three miles. In this area, the route roughly coincides with the designated shoreline and 100 year floodplain. This route would also cross the Columbia River approximately five miles below Priest rapids Dam. Both the Columbia River and Priest Rapids Lake are Lacustrine wetland systems. Palustrine wetlands found in this area are comprised of agricultural ponds, and persistent and ephemeral wetlands. Route Segment 3c crosses Lower Crab Creek, which has some emergent riparian vegetation present and its 100 year floodplain. Wetland systems associated with Lower Crab Creek include both Palustrine and Lacustrine wetland types. Several irrigation canals would be crossed including Mattawa Drain, Saddle Mountain Wasteway and Wahluke Branch Canal. Other water resources crossed by this route include several un-named ephemeral drainages. Riparian habitats along this route segment are typically dominated by non-native species, included noxious weeds.

3.15 GEOLOGY AND SOILS

This section presents information on the geology, geologic hazards, and soils in the Project area.

3.15.1 Data Sources

The evaluation was conducted using digital data sources and previously conducted studies. Sources reviewed included the Soil Survey of Yakima Training Center, published by the National Cooperative Soil Survey (NCSS) in 1994 (NCSS 1994); the Natural Resources Conservation Service (NRCS) Web Soil Survey; soil data from the National Resources Conservation Service (NRCS 2009) for Yakima County, Grant County, Benton County, Kittitas County and the Yakima Training Center; an article on the geology of the Terrace Heights community near the City of Yakima (Lind and Vachon n.d.); and geologic maps of the Priest Rapids (Reidel and Fecht 1994) and Yakima (Walsh 1986) quadrangles from the Washington State Department of Natural Resources (WDNR). The Washington Division of Geology and Earth Resources (WDGER), a division of the WDNR maintains information about the existing geology and geologic hazards in the state of Washington. Data from WDGER that was used included Surface Geology, scale 1:100,000, Landslides, scale 1:24,000, Siesmogenic Features consisting of active faults, and Ground Response which included liquefaction susceptibility.

3.15.2 Current Conditions and Trends, Regional Overview

3.15.2.1 Geology

The Project area is located in the Columbia Plateaus physiographic province. The geology of the Project area consists of interbedded volcanic and sedimentary rocks of the Columba River Basalt Group. The Columbia River Basalt formed when lava erupted intermittently out of north-northwest-trending fissure systems across southeastern Washington and adjacent portions Idaho and Oregon during the Miocene (17 to 6 million years ago). About the time of the last basalt flow, the Cascade Range became active again and mudflows and pyroclastic material were interfingered with basalt flows. Streams carried this lighter material towards the eastern lowlands, creating the uppermost portion of the Ellensburg Formation (NCSS 1994). The Yakima River flowed over the basalt surface as tectonic forces caused enough steady north-south pressure to fold the basalt like an accordion from Toppenish to Ellensburg, forming ridges and valleys.

Yakima Ridge is part of the long, parallel ridges of the Yakima Fold Belt (Lind and Vachon n.d.). The majority of faulting in the area is associated with creation of this fold belt during the late Miocene, so they are not considered active for power line design purposes. Faults that are considered active are shown on the Geohazards Map in Appendix A and are discussed in more detail in section 3.15.4.

As the ridge rose and river cut down, the Yakima River deposited a flat layer of cobbles, gravels, pebbles and silts onto its floodplain, which eventually rose in elevation due to uplift, out of reach of the river, resulting in a terrace (Lind and Vachon n.d.).

The Project area was subject to as many as 40 catastrophic floods during the Pleistocene (10,000-18,000 years ago), as a result of glaciers damming and releasing the Clark Fork River in northern Idaho and Montana. At Wallula Gap, south of the Tri-Cities, the constricted topography trapped the flooding water, allowing it to back up into the Yakima area where sediments settled onto hillsides, terraces and valleys (Lind and Vachon n.d.). The granite erratics in the area are evidence of these floods. These granite boulders were transported by large chunks of ice and deposited as the ice melted (NCSS 1994).

More recently, during the late Pleistocene (10,000 years ago), the continental and alpine glaciers melted back, releasing large amounts of water and trapped sediment. Windblown glacial dust, called loess, was deposited in a thick layer across eastern Washington. Loess comprises the primary component of the rich, silt-loam soils of the area (Lind and Vachon n.d.).

3.15.2.2 Geologic Hazards

Topography in the Project area consists of gently rolling to moderate hilly plateaus and steep slopes from Umtanum Ridge to the Columbia River and in the Saddle Mountains ridges to Lower Crab Creek. Elevations in the Project area range from 400 to 2,940 feet above sea level.

Geologic hazards in the Project area generally consist of Quaternary faults and their associated seismogenic events (earthquakes), liquefaction, steep terrain and landslide susceptibility. Earthquakes are the expression of large energy releases that result from sudden movement along faults. Quaternary faults are considered active and therefore are likely to have earthquakes occur along their length in the future. The U.S. Geographical Survey (USGS) measures seismicity as the probability an area would be affected by a damaging earthquake. It is measured as the probability of a certain degree of ground shaking in terms of the percentage of acceleration due to gravity.

In accordance with the National Electric Safety Code (NESC), the Proponent is required to consider the potential for seismic activity in the design of transmission structures and facilities, and must construct the transmission structures and substation facilities to withstand seismic forces. The Project area is located in a moderately active seismic region of Washington designated by the Uniform Building Code as Seismic Zone 2B, which is the middle of the scale.

The USGS Quaternary Fault and Fold Database (part of the Earthquake Hazards Program) was reviewed to identify potentially hazardous faults near the Project area. The only active fault identified in this dataset was the Saddle Mountains Fault located along the bottom of the northern slope of the Saddle Mountains. However, additional faults were identified using data obtained from WDGER. In addition to the aforementioned Saddle Mountains Fault, WDGER identified structure faults associated with the Saddle Mountains Fault, the Umtanum Ridge-Gable Mountain Fault, and structure faults associated with the Umtanum Ridge-Gable Mountain Fault. All of the additional faults are considered to be of indeterminate age at this time, and are therefore classified as Class B structures. This classification indicates further study would need to be conducted to determine whether the structures are Quaternary in age and therefore considered active. All of these faults are shown on the Geohazards Map in Appendix A.

Liquefaction occurs when soils lose shear strength and deform during an earthquake, acting like quicksand which is capable of causing great damage to structures in the area. Liquefaction typically occurs in areas of loose sandy soils that are saturated with water, such as low-lying coastal areas, lakeshores, and river valleys. Liquefaction susceptibility maps have been prepared for each county in the state of Washington, including Yakima, Grant, Benton and Kittitas counties (WDGER 2010d). These maps provide an estimate of the likelihood that soil will liquefy as a result of earthquake shaking based on the physical characteristics of the soil, (e.g., grain texture, compaction, and depth of groundwater). Liquefaction susceptibility maps depict the relative hazard in terms of low, low to moderate and moderate to high liquefaction susceptibility (Geohazards Map-Appendix A). The risk of liquefaction is low throughout most of the Project area, with the exception of alluvium in some drainages and outburst flood deposits where small areas of low to moderate and moderate to high susceptibility occur. It should also be noted that the mapped landslides, described below, are mapped as moderate to high areas of susceptibility.

Landslides are the downward and outward movement of earth materials on a slope through sliding and/or flowing along a slope failure plane. The slope failure can be a result of one, or more commonly a combination of the following, ground saturation; ground shaking; removal of the ‘toe’ of the feature; and loading the upslope end of the feature. Landslides in the Project area have been identified by the WDGER (WDGER 2010b). Historical and Quaternary landslide deposits are shown on the Geohazards map in Appendix A. These landslide features are along alternative Route Segments 1b, 1c, and 2d. These features are of unknown age, but aerial photo review indicates they are not currently active. While stable Quaternary landslide features are constructed upon regularly, to maintain the stability of these features field review and determination of Best Management Practices (BMPs) for these two areas would be prudent.

The northern slopes of the Saddle Mountains along Route Segment 3c are subject to rockfall and sluffing due to the steep slopes. While large mass-wasting events are improbable in their current undisturbed condition, large-scale modification of the existing slope conditions (e.g., access roads.) should be avoided.

3.15.2.3 Soils

The soil types present in the Project area can be generally divided into three groups:

- Soils found on alluvial fans;
- Soils found on uplands, hillslopes, ridgetops and benches; and
- Soils found on terraces, floodplains, escarpments and channeled scablands.

The parent materials for alluvial fan soils primarily consist of loess and alluvium. These soils are well drained and their slopes range from 0 to 30 percent. The main land uses that overlay this soil group are military training and grazing. Limitations to the use of these soils include hard pan, salt accumulation and the potential for water erosion.

The parent materials for upland, hillslope, ridgetop and bench soils primarily consist of loess, alluvium, residuum derived from basalt, colluvium derived from basalt and loess derived from basalt. These soils are well drained to somewhat excessively drained, and they are generally steeper than alluvial fan soils, with slopes ranging from 0 to 60%. The main land uses that overlay this soil group are military training and grazing. Limitations to the use of these soils include slope, depth to bedrock, rock fragments and the potential for water erosion.

The parent materials for terrace, floodplain, escarpment and Channeled Scabland soils primarily consist of alluvium, loess, eolian sands, lake sediments and old alluvium. These soils are well drained to excessively drained, and they are also generally steeper than alluvial fan soils, with slopes ranging from 0 to 60%. The main land uses that overlay this soil group are military training and grazing. Limitations to the use of these soils include salt accumulation, depth to bedrock and slope.

Ground disturbance, changes in grade and changes in soil stability from construction activities can significantly impact soils susceptible to wind and water erosion. The NRCS considers slope and soil properties such as cohesion, drainage and organic content in determining soil erosion potential of soils.

The NRCS data provided classifies water erosion potential (K factor without rock fragments) on a scale from 0.10 to 0.64, with 0.10 having the lowest water erosion potential and 0.64 having the highest water erosion potential. In this analysis, water erosion potential from 0.10 to 0.28 is classified as low, water erosion potential from 0.29 to 0.46 is classified as moderate and water erosion potential from 0.47 to 0.64 is classified as high. Water erosion potential for each zone is discussed in Section 3.15.5. Water erosion potential for the Project area is presented on the Soil Erosion Potential by Water Map in Appendix A.

The NRCS data provided classifies wind erosion potential (Wind Erodibility Index) on a scale from 0 to 250, with 0 having the lowest wind erosion potential, and 250 having the highest wind erosion potential. In this analysis, wind erosion potential from 0 to 50 is classified as low, wind erosion potential from 51 to 100 is classified as moderate and wind erosion potential from 101 to 250 is classified as high. Wind erosion potential for each zone is discussed in Section 3.15.4. Wind erosion potential for the Project area is presented on the Soil Erosion Potential by Wind Map in Appendix A.

Soils with the ability to recover from degradation will have the best potential for revegetation and restoration once a construction project has been completed. Soil resilience is dependent upon adequate stores of organic matter, good soil structure, low salt and sodium levels, adequate nutrient levels, microbial biomass and diversity, adequate precipitation for recovery, and other soil properties. The NRCS provides soil restoration potential ratings for each soil type, from low to high restoration potential. Soil restoration potential for each zone is discussed in Section 3.15.4. Soil restoration potential for the Project area is shown on both the Soil Erosion Potential by Water and Soil Erosion Potential by Wind Maps in Appendix A.

3.15.3 Current Management Considerations

Pertinent laws, ordinances, regulations and standards governing soil resources and geological hazards are summarized and discussed below:

Soil and Water Resources Conservation Act of 1977
Legislation providing for the collection and analysis of soil and related resource data and the appraisal of the status, condition, and trends for these resources. The Act (16 U.S.C. 2001 et seq.) provides for the U.S. Department of Agriculture (USDA) to possess information, technical expertise, and a system for providing assistance to land users with respect to conservation and use of soils, plants, woodlands, watershed protection, and related resource uses. The full suite of regulations promulgated by the USDA under this Act is available at 7 C.F.R. 600-699.

Washington State Environmental Policy Act
The Washington State Environmental Policy Act (SEPA), Chapter 43.21C RCW provides the framework for agencies to consider the environmental consequences of a proposal before taking action. It also gives agencies the ability to condition a proposal due to identified likely significant adverse impacts. The Act is implemented through the SEPA Rules, Chapter 197-11 WAC.

Environmental review is required for any proposal which involves a government "action," as defined in the SEPA Rules (WAC 197-11-704), and is not categorically exempt (WAC 197-11-800 through 890). Project actions involve an agency decision on a specific project, such as a construction project or timber harvest. Non-project actions involve decisions on policies, plans, or programs, such as the adoption of a comprehensive plan or development regulations.

The SEPA review and checklist require an evaluation of unstable soils, evidence of past landslides, erosion potential and other geologic hazards.

The Institute of Electrical and Electronics Engineers
The Institute of Electrical and Electronics Engineers (IEEE) 693 “Recommended Practices for Seismic Design of Substations” was developed by the Substations Committee of the IEEE Power Engineering Society, and approved by the American National Standards Institute and the IEEE-SA Standards Board. This document provides seismic design recommendations for substations and equipment consisting of seismic criteria, qualification methods and levels, structural capacities, performance requirements for

equipment operation, installation methods, and documentation. This recommended practice emphasizes the qualification of electrical equipment.

IEEE 693 is intended to establish standard methods of providing and validating the seismic withstand capability of electrical substation equipment. It provides detailed test and analysis methods for each type of major equipment or component found in electrical substations. This recommended practice is intended to assist the substation user or operator in providing substation equipment that will have a high probability of withstanding seismic events to predefined ground acceleration levels. It establishes standard methods of verifying seismic withstand capability, which gives the substation designer the ability to select equipment from various manufacturers, knowing that the seismic withstand rating of each manufacturer's equipment is an equivalent measure. Although most damaging seismic activity occurs in limited areas, many additional areas could experience an earthquake with forces capable of causing damage. This recommended practice should be used in all areas that may experience earthquakes.

2009 International Building Code
Published by the International Code Council, the 2009 International Building Code (IBC) is used by the state of Washington and local jurisdictions. The purpose and subject matter of the IBC include comprehensive provisions regulating construction aspects of building and providing uniform standards for the purpose of protecting health, safety and general welfare.

Yakima Critical Areas Ordinance
The Washington State Growth Management Act (GMA) identifies Critical Areas. Critical areas established in each Washington State county in accordance with RCW 36.70A.170. The Yakima County Critical Areas Ordinance (CAO) regulates geo-hazards within the county. Crossing of these areas in Yakima County may require a Critical Areas Permit.

3.15.4 Route Segment or Zone-Specific Considerations

3.15.4.1 Zone 1 Overview

Zone 1 is comprised of the western-most end of Yakima Ridge, an east-west trending anticline anticline as shown on the Geohazards Map in Appendix A. Route Segment 1a parallels Yakima Ridge along its northwestern foothills. Geologic hazards in the area are limited to ephemeral creek washes. Route Segments 1b and 1c continue along the northwestern foothills prior to turning south and traversing the ridge. In addition to ephemeral creek washes, there are three landslides mapped along the alignments along the northwestern foothills. Recent movement was not evident in aerial photography, however, to maintain the stability of these features field review and determination of BMPs for this area would be prudent. Traversing Yakima Ridge, the alignments cross an inactive thrust fault evidenced by exposed strata along the northern ridgeline. As the alignments continue to Zone 2 along the southern foothills ephemeral creek washes continue to pose a hazard.

The study areas for soils characterization for each Zone consisted of a 500 foot-wide corridor (250 feet either side of the alternative route segment centerlines). The study area for Zone 1 contains 288 acres of soils with high water erosion potential, zero acres of soils with high wind erosion potential, and 260 acres of soils with low soil restoration potential.

Soil details for each route segment in Zone 1, including water erosion potential, wind erosion potential and soil restoration potential are shown in Table 3.15-1 below.

TABLE 3.15-1 SOIL UNITS IN ZONE 1

MAP UNIT NAME/SLOPE	WATER EROSION POTENTIAL	WIND EROSION POTENTIAL	DESCRIPTION	AREA (acres)	SOIL RESTORATION POTENTIAL
ROUTE SEGMENT 1A (AGENCY PREFERRED ALTERNATIVE)					
Ritzville silt loam, 8 to 15 percent slopes	High	Moderate	This component is on hills, hillslopes. The parent material consists of loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	44.1	Moderate
Roza clay loam, 15 to 30 percent slopes	Moderate	Moderate	This component is on uplands. The parent material consists of alluvium and/or residuum derived from fine textured sediments. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	5.8	Moderate
Esquatzel silt loam, 0 to 2 percent slopes	High	Moderate	This component is on flood plains. The parent material consists of alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	3.0	Moderate
Harwood-Burke-Wiehl silt loams, 2 to 5 percent slopes	High	Moderate	The Harwood component is on terraces. The parent material consists of loess and old alluvium. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained. The Burke component is on hills, hillslopes. The parent material consists of loess. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained. The Wiehl component is on terraces. The parent material consists of eolian deposits over residuum weathered from sandstone and siltstone. Depth to a root restrictive layer, bedrock, paralithic, is 20 to 40 inches. The natural drainage class is well drained.	2.6	Low

MAP UNIT NAME/SLOPE	WATER EROSION POTENTIAL	WIND EROSION POTENTIAL	DESCRIPTION	AREA (acres)	SOIL RESTORATION POTENTIAL
Harwood-Burke-Wiehl silt loams, 15 to 30 percent slopes	High	Moderate	The Burke component is on hills, hillslopes. The parent material consists of loess. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained. The Harwood component is on terraces. The parent material consists of loess and old alluvium. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained. The Wiehl component is on terraces. The parent material consists of eolian deposits over residuum weathered from sandstone and siltstone. Depth to a root restrictive layer, bedrock, paralithic, is 20 to 40 inches. The natural drainage class is well drained.	3.4	Low
Kiona stony silt loam, 15 to 45 percent slopes	Moderate	Low	This component is on hillslopes, hills. The parent material consists of loess and colluvium derived from basalt. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	9.4	Low
ROUTE SEGMENT 1B (AGENCY PREFERRED ALTERNATIVE)					
Rock Creek very stony silt loam, 0 to 30 percent slopes	Moderate	Low	This component is on hills, ridges, plateaus. The parent material consists of loess and residuum weathered from basalt. Depth to a root restrictive layer, bedrock, lithic, is 8 to 20 inches. The natural drainage class is well drained.	1.1	Low
Roza clay loam, 15 to 30 percent slopes	Moderate	Moderate	This component is on uplands. The parent material consists of alluvium and/or residuum derived from fine textured sediments. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	1.0	Moderate
Kiona stony silt loam, 15 to 45 percent slopes	Moderate	Low	This component is on hillslopes, hills. The parent material consists of loess and colluvium derived from basalt. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	2.4	Low

MAP UNIT NAME/SLOPE	WATER EROSION POTENTIAL	WIND EROSION POTENTIAL	DESCRIPTION	AREA (acres)	SOIL RESTORATION POTENTIAL
Lickskillet very stony silt loam, 5 to 45 percent slopes	Moderate	Low	This component is on hills, hillslopes, ridges. The parent material consists of residuum and colluvium weathered from basalt, and loess. Depth to a root restrictive layer, bedrock, lithic, is 12 to 20 inches. The natural drainage class is well drained.	13.2	High
Meloza-Roza complex, 15 to 30 percent slopes	Moderate	Moderate	The Roza component is on alluvial fans. The parent material consists of fine textured interbedded sediments. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. The Meloza component is on alluvial fans. The parent material consists of fine textured interbedded sediments. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	3.1	Moderate
Vantage-Clerf-Rubble land complex, 30 to 45 percent slopes	Moderate	Low	The Vantage component is on ridges, hillslopes. The parent material consists of loess, colluvium and residuum from basalt. Depth to a root restrictive layer, bedrock, lithic, is 12 to 20 inches. The natural drainage class is well drained. The Clerf component is on hillslopes, ridges. The parent material consists of loess, colluvium and residuum from basalt. Depth to a root restrictive layer, bedrock, lithic, is 20 to 40 inches. The natural drainage class is well drained.	0.4	Moderate
Wanapum cobbly loam, 2 to 5 percent slopes	Moderate	Low	This component is on alluvial fans. The parent material consists of loess and alluvium. Depth to a root restrictive layer, duripan, is 11 to 19 inches. The natural drainage class is well drained.	4.3	Low
Wanapum complex, 5 to 10 percent slopes	High	Moderate	This component is on alluvial fans. The parent material consists of loess and alluvium. Depth to a root restrictive layer, duripan, is 11 to 19 inches. The natural drainage class is well drained.	53.1	Low

MAP UNIT NAME/SLOPE	WATER EROSION POTENTIAL	WIND EROSION POTENTIAL	DESCRIPTION	AREA (acres)	SOIL RESTORATION POTENTIAL
Wanapum complex, 10 to 15 percent slopes	High	Moderate	This component is on alluvial fans. The parent material consists of loess and alluvium. Depth to a root restrictive layer, duripan, is 11 to 19 inches. The natural drainage class is well drained.	14.8	Low
Rock Creek very stony silt loam, 0 to 30 percent slopes	Moderate	Low	This component is on ridges, plateaus. The parent material consists of residuum from basalt with loess. Depth to a root restrictive layer, bedrock, lithic, is 8 to 20 inches. The natural drainage class is well drained.	24.8	Low
Kiona stony silt loam, 15 to 45 percent slopes	Moderate	Low	This component is on hillslopes, hills. The parent material consists of colluvium from basalt and loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	23.9	Low
Lickskillet very stony silt loam, 5 to 45 percent slopes	Moderate	Low	This component is on plateaus, ridges. The parent material consists of residuum from basalt, and loess. Depth to a root restrictive layer, bedrock, lithic, is 12 to 20 inches. The natural drainage class is well drained.	168.5	High
Starbuck-Rock outcrop complex, 0 to 45 percent slopes	High	Moderate	This component is on structural benches. The parent material consists of loess and alluvium. Depth to a root restrictive layer, bedrock, lithic, is 12 to 20 inches. The natural drainage class is well drained.	68.8	Moderate
Disage very cobbly loam, 3 to 15 percent slopes	Moderate	Low	This component is on hillslopes, ridges. The parent material consists of residuum and colluvium from basalt with loess. Depth to a root restrictive layer, bedrock, lithic, is 14 to 20 inches. The natural drainage class is well drained.	0.0	Low
Drysel loam, 5 to 10 percent slopes	High	Moderate	This component is on alluvial fans. The parent material consists of loess and alluvium. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained.	0.7	Low

MAP UNIT NAME/SLOPE	WATER EROSION POTENTIAL	WIND EROSION POTENTIAL	DESCRIPTION	AREA (acres)	SOIL RESTORATION POTENTIAL
Argabak-Horseflat complex, 3 to 15 percent slopes	High	Low	The Horseflat component is on hillslopes, ridges, structural benches. The parent material consists of colluvium and residuum from basalt and loess. Depth to a root restrictive layer, bedrock, lithic, is 12 to 20 inches. The natural drainage class is well drained. The Argabak component is on structural benches, hillslopes. The parent material consists of loess and residuum weathered from basalt. Depth to a root restrictive layer, bedrock, lithic, is 5 to 12 inches. The natural drainage class is well drained.	0.1	Low
ROUTE SEGMENT 1C					
Rock Creek very stony silt loam, 0 to 30 percent slopes	Moderate	Low	This component is on hills, ridges, plateaus. The parent material consists of loess and residuum weathered from basalt. Depth to a root restrictive layer, bedrock, lithic, is 8 to 20 inches. The natural drainage class is well drained.	33.3	Low
Roza clay loam, 15 to 30 percent slopes	Moderate	Moderate	This component is on uplands. The parent material consists of alluvium and/or residuum derived from fine textured sediments. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	1.2	Moderate
Starbuck-Rock outcrop complex, 0 to 45 percent slopes	High	Moderate	This component is on hills, hillslopes, structural benches. The parent material consists of loess and residuum derived from basalt. Depth to a root restrictive layer, bedrock, lithic, is 12 to 20 inches. The natural drainage class is well drained.	74.8	Moderate
Starbuck-Rock outcrop complex, 45 to 60 percent slopes	High	Moderate	This component is on hills, hillslopes, structural benches. The parent material consists of loess and residuum derived from basalt. Depth to a root restrictive layer, bedrock, lithic, is 12 to 20 inches. The natural drainage class is well drained.	3.6	Moderate
Willis silt loam, 8 to 15 percent slopes	High	Moderate	This component is on uplands. The parent material consists of loess. Depth to a root restrictive layer, bedrock, lithic, is 30 to 60 inches. The natural drainage class is well drained.	2.1	Moderate

MAP UNIT NAME/SLOPE	WATER EROSION POTENTIAL	WIND EROSION POTENTIAL	DESCRIPTION	AREA (acres)	SOIL RESTORATION POTENTIAL
Wanapum cobbly loam, 2 to 5 percent slopes	Moderate	Low	This component is on fan piedmonts. The parent material consists of loess and alluvium. Depth to a root restrictive layer, duripan, is 11 to 19 inches. The natural drainage class is well drained.	8.9	Low
Wanapum complex, 5 to 10 percent slopes	Moderate	Moderate	This component is on fan piedmonts. The parent material consists of loess and alluvium. Depth to a root restrictive layer, duripan, is 11 to 19 inches. The natural drainage class is well drained.	37.0	Low
Wanapum complex, 10 to 15 percent slopes	Moderate	Moderate	This component is on fan piedmonts. The parent material consists of loess and alluvium. Depth to a root restrictive layer, duripan, is 11 to 19 inches. The natural drainage class is well drained.	16.9	Low
Kiona stony silt loam, 15 to 45 percent slopes	Moderate	Low	This component is on hillslopes, hills. The parent material consists of loess and colluvium derived from basalt. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	19.8	Low
Lickskillet very stony silt loam, 5 to 45 percent slopes	Moderate	Low	This component is on hills, hillslopes, ridges. The parent material consists of residuum and colluvium weathered from basalt, and loess. Depth to a root restrictive layer, bedrock, lithic, is 12 to 20 inches. The natural drainage class is well drained.	176.1	High
Moxee silt loam, 2 to 15 percent slopes	High	Moderate	This component is on uplands. The parent material consists of loess. Depth to a root restrictive layer, duripan, is 10 to 20 inches. The natural drainage class is well drained.	13.9	Moderate
Meloza-Roza complex, 15 to 30 percent slopes	Moderate	Moderate	The Roza component is on alluvial fans. The parent material consists of fine textured interbedded sediments. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. The Meloza component is on alluvial fans. The parent material consists of fine textured interbedded sediments. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	0.2	Moderate

MAP UNIT NAME/SLOPE	WATER EROSION POTENTIAL	WIND EROSION POTENTIAL	DESCRIPTION	AREA (acres)	SOIL RESTORATION POTENTIAL
Wanapum cobbly loam, 2 to 5 percent slopes	Moderate	Low	This component is on alluvial fans. The parent material consists of loess and alluvium. Depth to a root restrictive layer, duripan, is 11 to 19 inches. The natural drainage class is well drained.	0.9	Low
Wanapum complex, 5 to 10 percent slopes	High	Moderate	This component is on alluvial fans. The parent material consists of loess and alluvium. Depth to a root restrictive layer, duripan, is 11 to 19 inches. The natural drainage class is well drained.	1.6	Low
Wanapum complex, 10 to 15 percent slopes	High	Moderate	This component is on alluvial fans. The parent material consists of loess and alluvium. Depth to a root restrictive layer, duripan, is 11 to 19 inches. The natural drainage class is well drained.	1.0	Low
Starbuck-Rock outcrop complex, 0 to 45 percent slopes	High	Moderate	This component is on structural benches. The parent material consists of loess and alluvium. Depth to a root restrictive layer, bedrock, lithic, is 12 to 20 inches. The natural drainage class is well drained.	0.5	Moderate

3.15.4.2 Zone 2 Overview

With the exception of Route Segment 2d, routes in Zone 2 parallel Yakima Ridge along its southern foothills as shown on the Geohazards Map in Appendix A. No significant geologic hazards are present. Ephemeral creek washes are present, but there are no landslides or fault lines mapped along Route Segments 2a, 2b, or 2c. Route Segment 2d traverses south to north over Yakima Ridge terminating at the Columbia River at the bottom of Umtanum Ridge. This route is in the vicinity of three active, though Class B (undefined age) faults. It is also in the vicinity of several landslides features. Recent movement was not evident in aerial photography, however, to maintain the stability of these features field review and determination of BMPs for this area would be prudent.

The study area for Zone 2 contains 705.9 acres of soils with high water erosion potential, zero acres of soils with high wind erosion potential and 359.2 acres of soils with low soil restoration potential.

Soil details for each route segment in Zone 2, including water erosion potential, wind erosion potential and soil restoration potential are shown in Table 3.15-2 below.

TABLE 3.15-2 SOIL UNITS IN ZONE 2

MAP UNIT NAME/SLOPE	WATER EROSION POTENTIAL	WIND EROSION POTENTIAL	DESCRIPTION	AREA (acres)	SOIL RESTORATION POTENTIAL
ROUTE SEGMENT 2A (AGENCY PREFERRED ALTERNATIVE)					
Bakeoven very cobbly silt loam, 0 to 30 percent slopes	Moderate	Low	This component is on hillslopes, structural benches, hills. The parent material consists of loess and residuum derived from basalt. Depth to a root restrictive layer, bedrock, lithic, is 4 to 10 inches. The natural drainage class is well drained.	7.6	Low
Lickskillet very stony silt loam, 5 to 45 percent slopes	Moderate	Low	This component is on hills, hillslopes, ridges. The parent material consists of residuum and colluvium weathered from basalt, and loess. Depth to a root restrictive layer, bedrock, lithic, is 12 to 20 inches. The natural drainage class is well drained.	2.2	High
Moxee cobbly silt loam, 0 to 30 percent slopes	High	Low	This component is on uplands. The parent material consists of loess. Depth to a root restrictive layer, duripan, is 10 to 20 inches. The natural drainage class is well drained.	12.6	Moderate
Renslow silt loam, basalt substratum, 5 to 15 percent slopes	High	Moderate	This component is on hillslopes, hills. The parent material consists of loess. Depth to a root restrictive layer, bedrock, lithic, is 40 to 60 inches. The natural drainage class is well drained.	7.0	Moderate
ROUTE SEGMENT 2B					
Ritzville silt loam, 8 to 15 percent slopes	High	Moderate	This component is on hills, hillslopes. The parent material consists of loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	18.1	Moderate
Ritzville silt loam, 15 to 30 percent slopes	High	Moderate	This component is on hills, hillslopes. The parent material consists of loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	1.0	Moderate
Selah silt loam, 2 to 5 percent slopes	High	Moderate	This component is on terraces. The parent material consists of loess and old alluvium. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained.	8.8	Moderate
Selah silt loam, 5 to 8 percent slopes	High	Moderate	This component is on terraces. The parent material consists of loess and old alluvium. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained.	1.3	Moderate
Selah silt loam, 8 to 15 percent slopes	High	Moderate	This component is on terraces. The parent material consists of loess and old alluvium. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained.	20.6	Moderate

MAP UNIT NAME/SLOPE	WATER EROSION POTENTIAL	WIND EROSION POTENTIAL	DESCRIPTION	AREA (acres)	SOIL RESTORATION POTENTIAL
Starbuck-Rock outcrop complex, 0 to 45 percent slopes	High	Moderate	This component is on hills, hillslopes, structural benches. The parent material consists of loess and residuum derived from basalt. Depth to a root restrictive layer, bedrock, lithic, is 12 to 20 inches. The natural drainage class is well drained.	2.6	Moderate
Willis silt loam, 2 to 5 percent slopes	High	Moderate	This component is on uplands. The parent material consists of loess. Depth to a root restrictive layer, bedrock, lithic, is 30 to 60 inches. The natural drainage class is well drained.	9.3	Moderate
Willis silt loam, 8 to 15 percent slopes	High	Moderate	This component is on uplands. The parent material consists of loess. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained.	47.3	Moderate
Bakeoven very cobbly silt loam, 0 to 30 percent slopes	Moderate	Low	This component is on hill slopes, structural benches, hills. The parent material consists of loess and residuum from basalt. Depth to a root restrictive layer, bedrock, lithic, is 4 to 10 inches. The natural drainage class is well drained.	99.5	Low
Finley fine sandy loam, 0 to 5 percent slopes	Moderate	Moderate	This component is on terraces, alluvial fans. The parent material consists of alluvium. Depth to a root restrictive layer, strongly contrasting textural stratification, is 20 to 40 inches. The natural drainage class is well drained.	0.6	Low
Finley cobbly fine sandy loam, 0 to 5 percent slopes	Moderate	Moderate	This component is on alluvial fans, terraces. The parent material consists of alluvium. Depth to a root restrictive layer, strongly contrasting textural stratification, is 20 to 40 inches. The natural drainage class is well drained.	1.2	Low
Kiona stony silt loam, 15 to 45 percent slopes	Moderate	Low	This component is on hillslopes, hills. The parent material consists of loess and colluvium derived from basalt. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	48.2	Low
Lickskillet very stony silt loam, 5 to 45 percent slopes	Moderate	Low	This component is on plateaus, ridges. The parent material consists of residuum from basalt, and loess. Depth to a root restrictive layer, bedrock, lithic, is 12 to 20 inches. The natural drainage class is well drained.	163.4	High
Moxee silt loam, 2 to 15 percent slopes	High	Moderate	This component is on uplands. The parent material consists of loess. Depth to a root restrictive layer, duripan, is 10 to 20 inches. The natural drainage class is well drained.	19.3	Moderate

MAP UNIT NAME/SLOPE	WATER EROSION POTENTIAL	WIND EROSION POTENTIAL	DESCRIPTION	AREA (acres)	SOIL RESTORATION POTENTIAL
Moxee cobbly silt loam, 0 to 30 percent slopes	High	Low	This component is on uplands. The parent material consists of loess. Depth to a root restrictive layer, duripan, is 10 to 20 inches. The natural drainage class is well drained.	12.4	Moderate
Renslow silt loam, basalt substratum, 5 to 15 percent slopes	High	Moderate	This component is on hillslopes, hills. The parent material consists of loess. Depth to a root restrictive layer, bedrock, lithic, is 40 to 60 inches. The natural drainage class is well drained.	1.4	Moderate
Ritzville silt loam, 2 to 5 percent slopes	High	Moderate	This component is on hills, hillslopes. The parent material consists of loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	3.8	Moderate
Selah silt loam, 2 to 5 percent slopes	High	Moderate	This component is on alluvial fans. The parent material consists of loess and old alluvium. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained.	2.5	Moderate
Selah silt loam, 5 to 10 percent slopes	High	Moderate	This component is on alluvial fans. The parent material consists of loess and alluvium. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained.	0.3	Moderate
Selah silt loam, 10 to 15 percent slopes	High	Moderate	This component is on alluvial fans. The parent material consists of loess and alluvium. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained.	1.0	Moderate
Kiona stony silt loam, 15 to 45 percent slopes	Moderate	Low	This component is on plateaus, ridges. The parent material consists of residuum from basalt, and loess. Depth to a root restrictive layer, bedrock, lithic, is 12 to 20 inches. The natural drainage class is well drained.	6.0	Low
Lickskillet very stony silt loam, 5 to 45 percent slopes	Moderate	Low	This component is on structural benches. The parent material consists of loess and alluvium. Depth to a root restrictive layer, bedrock, lithic, is 12 to 20 inches. The natural drainage class is well drained.	7.7	High
Willis silt loam, 8 to 15 percent slopes	High	Moderate	This component is on uplands. The parent material consists of loess. Depth to a root restrictive layer, bedrock, lithic, is 30 to 60 inches. The natural drainage class is well drained.	4.8	Moderate
Bakeoven very cobbly silt loam, 0 to 30 percent slopes	Moderate	Low	This component is on hillslopes, structural benches, hills. The parent material consists of loess and residuum derived from basalt. Depth to a root restrictive layer, bedrock, lithic, is 4 to 10 inches. The natural drainage class is well drained.	14.2	Low

MAP UNIT NAME/SLOPE	WATER EROSION POTENTIAL	WIND EROSION POTENTIAL	DESCRIPTION	AREA (acres)	SOIL RESTORATION POTENTIAL
ROUTE SEGMENT 2C (AGENCY PREFERRED ALTERNATIVE)					
Ritzville silt loam, 8 to 15 percent slopes	High	Moderate	This component is on hills, hillslopes. The parent material consists of loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	0.0	Moderate
Ritzville silt loam, 15 to 30 percent slopes	High	Moderate	This component is on hills, hillslopes. The parent material consists of loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	0.9	Moderate
Ritzville silt loam, basalt substratum, 0 to 5 percent slopes	High	Moderate	This component is on hills, hillslopes. The parent material consists of loess. Depth to a root restrictive layer, bedrock, lithic, is 40 to 60 inches. The natural drainage class is well drained.	5.4	Moderate
Ritzville silt loam, basalt substratum, 5 to 15 percent slopes	High	Moderate	This component is on hills, hillslopes. The parent material consists of loess. Depth to a root restrictive layer, bedrock, lithic, is 40 to 60 inches. The natural drainage class is well drained.	26.3	Moderate
Starbuck-Rock outcrop complex, 0 to 45 percent slopes	High	Moderate	This component is on hills, hillslopes, structural benches. The parent material consists of loess and residuum derived from basalt. Depth to a root restrictive layer, bedrock, lithic, is 12 to 20 inches. The natural drainage class is well drained.	2.5	Moderate
Willis silt loam, 2 to 5 percent slopes	High	Moderate	This component is on uplands. The parent material consists of loess. Depth to a root restrictive layer, bedrock, lithic, is 30 to 60 inches. The natural drainage class is well drained.	57.6	Moderate
Willis silt loam, 8 to 15 percent slopes	High	Moderate	This component is on uplands. The parent material consists of loess. Depth to a root restrictive layer, bedrock, lithic, is 30 to 60 inches. The natural drainage class is well drained.	120.9	Moderate
Cleman very fine sandy loam, 2 to 5 percent slopes	High	Moderate	This component is on flood plains. The parent material consists of alluvium. Depth to a root restrictive layer, strongly contrasting textural stratification, is 20 to 40 inches. The natural drainage class is well drained.	1.3	Moderate
Bakeoven very cobbly silt loam, 0 to 30 percent slopes	Moderate	Low	This component is on hillslopes, structural benches, hills. The parent material consists of loess and residuum derived from basalt. Depth to a root restrictive layer, bedrock, lithic, is 4 to 10 inches. The natural drainage class is well drained.	47.0	Low

MAP UNIT NAME/SLOPE	WATER EROSION POTENTIAL	WIND EROSION POTENTIAL	DESCRIPTION	AREA (acres)	SOIL RESTORATION POTENTIAL
Finley fine sandy loam, 0 to 5 percent slopes	Moderate	Moderate	This component is on terraces, alluvial fans. The parent material consists of alluvium. Depth to a root restrictive layer, strongly contrasting textural stratification, is 20 to 40 inches. The natural drainage class is well drained.	9.8	Low
Finley cobbly fine sandy loam, 0 to 5 percent slopes	Moderate	Moderate	This component is on alluvial fans, terraces. The parent material consists of alluvium. Depth to a root restrictive layer, strongly contrasting textural stratification, is 20 to 40 inches. The natural drainage class is well drained.	11.5	Low
Harwood-Burke-Wiehl very stony silt loams, 15 to 30 percent slopes	High	Low	The Burke component is on hills, hillslopes. The parent material consists of loess. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained. The Wiehl component is on terraces. The parent material consists of eolian deposits over residuum weathered from sandstone and siltstone. Depth to a root restrictive layer, bedrock, paralithic, is 20 to 40 inches. The natural drainage class is well drained. The Harwood component is on terraces. The parent material consists of loess and old alluvium. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained.	21.8	Low
Kiona stony silt loam, 15 to 45 percent slopes	Moderate	Low	This component is on hillslopes, hills. The parent material consists of loess and colluvium derived from basalt. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	13.3	Low
Lickskillet very stony silt loam, 5 to 45 percent slopes	Moderate	Low	This component is on hills, hillslopes, ridges. The parent material consists of residuum and colluvium weathered from basalt, and loess. Depth to a root restrictive layer, bedrock, lithic, is 12 to 20 inches. The natural drainage class is well drained.	29.4	High
Moxee silt loam, 2 to 15 percent slopes	High	Moderate	This component is on uplands. The parent material consists of loess. Depth to a root restrictive layer, duripan, is 10 to 20 inches. The natural drainage class is well drained.	97.7	Moderate

MAP UNIT NAME/SLOPE	WATER EROSION POTENTIAL	WIND EROSION POTENTIAL	DESCRIPTION	AREA (acres)	SOIL RESTORATION POTENTIAL
Moxee cobbly silt loam, 0 to 30 percent slopes	High	Low	This component is on uplands. The parent material consists of loess. Depth to a root restrictive layer, duripan, is 10 to 20 inches. The natural drainage class is well drained.	75.0	Moderate
Ritzville silt loam, 2 to 5 percent slopes	High	Moderate	This component is on hills, hillslopes. The parent material consists of loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	28.2	Moderate
Willis silt loam, 8 to 15 percent slopes	High	Moderate	This component is on uplands. The parent material consists of loess. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained.	0.1	Moderate
ROUTE SEGMENT 2D (AGENCY PREFERRED ALTERNATIVE)					
Ritzville silt loam, 8 to 15 percent slopes	High	Moderate	This component is on hills, hillslopes. The parent material consists of loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	31.7	Moderate
Ritzville silt loam, 15 to 30 percent slopes	High	Moderate	This component is on hills, hillslopes. The parent material consists of loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	6.5	Moderate
Ritzville silt loam, 30 to 60 percent slopes	High	Moderate	This component is on hills, hillslopes. The parent material consists of loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	4.5	Moderate
Selah silt loam, 5 to 8 percent slopes	High	Moderate	This component is on terraces. The parent material consists of loess and old alluvium. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained.	0.4	Moderate
Starbuck silt loam, 2 to 15 percent slopes	High	Moderate	This component is on hills, hillslopes, structural benches. The parent material consists of loess and residuum derived from basalt. Depth to a root restrictive layer, bedrock, lithic, is 12 to 20 inches. The natural drainage class is well drained.	1.5	Moderate
Starbuck-Rock outcrop complex, 0 to 45 percent slopes	High	Moderate	This component is on hills, hillslopes, structural benches. The parent material consists of loess and residuum derived from basalt. Depth to a root restrictive layer, bedrock, lithic, is 12 to 20 inches. The natural drainage class is well drained.	7.5	Moderate

MAP UNIT NAME/SLOPE	WATER EROSION POTENTIAL	WIND EROSION POTENTIAL	DESCRIPTION	AREA (acres)	SOIL RESTORATION POTENTIAL
Starbuck-Rock outcrop complex, 45 to 60 percent slopes	High	Moderate	This component is on hills, hillslopes, structural benches. The parent material consists of loess and residuum derived from basalt. Depth to a root restrictive layer, bedrock, lithic, is 12 to 20 inches. The natural drainage class is well drained.	0.6	Moderate
Willis silt loam, 8 to 15 percent slopes	High	Moderate	This component is on uplands. The parent material consists of loess. Depth to a root restrictive layer, bedrock, lithic, is 30 to 60 inches. The natural drainage class is well drained.	31.1	Moderate
Bakeoven very cobbly silt loam, 0 to 30 percent slopes	Moderate	Low	This component is on hillslopes, structural benches, hills. The parent material consists of loess and residuum derived from basalt. Depth to a root restrictive layer, bedrock, lithic, is 4 to 10 inches. The natural drainage class is well drained.	37.6	Low
Finley fine sandy loam, 0 to 5 percent slopes	Moderate	Moderate	This component is on terraces, alluvial fans. The parent material consists of alluvium. Depth to a root restrictive layer, strongly contrasting textural stratification, is 20 to 40 inches. The natural drainage class is well drained.	0.5	Low
Kiona stony silt loam, 15 to 45 percent slopes	Moderate	Low	This component is on hillslopes, hills. The parent material consists of loess and colluvium derived from basalt. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	40.4	Low
Lickskillet silt loam, 5 to 30 percent slopes	Moderate	Low	This component is on hills, hillslopes, ridges. The parent material consists of residuum and colluvium weathered from basalt, and loess. Depth to a root restrictive layer, bedrock, lithic, is 12 to 20 inches. The natural drainage class is well drained.	0.0	High
Lickskillet very stony silt loam, 5 to 45 percent slopes	Moderate	Low	This component is on hills, hillslopes, ridges. The parent material consists of residuum and colluvium weathered from basalt, and loess. Depth to a root restrictive layer, bedrock, lithic, is 12 to 20 inches. The natural drainage class is well drained.	20.4	High
Moxee silt loam, 2 to 15 percent slopes	High	Moderate	This component is on uplands. The parent material consists of loess. Depth to a root restrictive layer, duripan, is 10 to 20 inches. The natural drainage class is well drained.	10.1	Moderate

MAP UNIT NAME/SLOPE	WATER EROSION POTENTIAL	WIND EROSION POTENTIAL	DESCRIPTION	AREA (acres)	SOIL RESTORATION POTENTIAL
Willis silt loam, 8 to 15 percent slopes	High	Moderate	This component is on uplands. The parent material consists of loess. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained.	0.0	Moderate

3.15.4.3 Zone 3 Overview

Route Segment 3b proceeds west along the edge of the Columbia River and crosses the river below Wanapum Dam. While there are no landslide features along the route segment, rockfall and ephemeral washes do pose a hazard. In addition, there are some localized zones of moderate to high liquefaction susceptibility along the southern portion. The northern portion of the route segment crosses larger moderate to high areas of liquefaction susceptibility, including the crossing location. There are some active (Class B) faults in the southern portion, and the northern portion of the route crosses the Late Quaternary (<130,000 years) Saddle Mountain thrust fault.

Route Segment 3c (Agency Preferred Alternative) proceeds east along the Columbia River, then crosses the river and continues north across a bench to the Saddle Mountains as shown on the Geohazards Map in Appendix A. The Columbia River crossing location is in an area of low liquefaction susceptibility. At the southern foot of the Saddle Mountains, the liquefaction susceptibility increases to Moderate. During the traverse of the Saddle Mountains, ephemeral creek washes become more numerous. Some active (Class B) faults are located near Route Segment 3c at the top of the Saddle Mountains, and the Late Quaternary (<130,000 years) Saddle Mountain thrust fault is located at the northern foot of the mountains. This inferred fault trace parallels the mountains and Lower Crab Creek. The northern slopes of the Saddle Mountains along Route Segment 3c is subject to rockfall and sluffing due to the steep slopes. While large mass-wasting events are improbable in their current undisturbed condition, large-scale modification of the existing slope conditions (e.g., access roads) should be avoided. As Route Segment 3c crosses the confluence of the Columbia and Lower Crab Creek, there are significant areas mapped as exhibiting moderate to high liquefaction potential.

The study area for Zone 3 contains 286.8 acres of soils with high water erosion potential, 632.7 acres of soils with high wind erosion potential and 798.9 acres of soils with low soil restoration potential.

Soil details for each route segment in Zone 3, including water erosion potential, wind erosion potential and soil restoration potential are shown in Table 3.15-3 below.

TABLE 3.15-3 SOIL UNITS IN ZONE 3

MAP UNIT NAME/SLOPE	WATER EROSION POTENTIAL	WIND EROSION POTENTIAL	DESCRIPTION	AREA (acres)	SOIL RESTORATION POTENTIAL
ROUTE SEGMENT 3A (AGENCY PREFERRED ALTERNATIVE)					
Schawana complex, 0 to 15 percent slopes	Low	High	This component is on structural benches, hillslopes. The parent material consists of eolian deposits over residuum weathered from basalt. Depth to a root restrictive layer, bedrock, lithic, is 8 to 20 inches. The natural drainage class is somewhat excessively drained.	4.9	Low

MAP UNIT NAME/SLOPE	WATER EROSION POTENTIAL	WIND EROSION POTENTIAL	DESCRIPTION	AREA (acres)	SOIL RESTORATION POTENTIAL
ROUTE SEGMENT 3B					
Schawana complex, 0 to 15 percent slopes	Low	High	This component is on structural benches, hillslopes. The parent material consists of eolian deposits over residuum weathered from basalt. Depth to a root restrictive layer, bedrock, lithic, is 8 to 20 inches. The natural drainage class is somewhat excessively drained.	28.1	Low
Water	Not Rated	Not Rated	-	7.2	Not Rated
Burbank loamy fine sand, 0 to 5 percent slopes	Low	High	This component is on outwash terraces. The parent material consists of eolian sands over gravelly glacial outwash. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is excessively drained.	22.9	Low
Burbank very cobbly loamy sand, 0 to 15 percent slopes	Low	Moderate	This component is on outwash terraces. The parent material consists of eolian sands over gravelly glacial outwash. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is excessively drained.	2.3	Low
Scooteney silt loam, 2 to 5 percent slopes	High	Moderate	This component is on terraces. The parent material consists of loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	1.8	Low
Scooteney silt loam, 5 to 15 percent slopes	High	Moderate	This component is on terraces. The parent material consists of loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	17.4	Low
Starbuck-Rock outcrop complex, 45 to 60 percent slopes	High	Moderate	This component is on hills, hillslopes, structural benches. The parent material consists of loess and residuum derived from basalt. Depth to a root restrictive layer, bedrock, lithic, is 12 to 20 inches. The natural drainage class is well drained.	17.1	Moderate
Water	Not Rated	Not Rated	-	0.1	Not Rated
Finley fine sandy loam, 0 to 5 percent slopes	Moderate	Moderate	This component is on terraces, alluvial fans. The parent material consists of alluvium. Depth to a root restrictive layer, strongly contrasting textural stratification, is 20 to 40 inches. The natural drainage class is well drained.	5.1	Low

MAP UNIT NAME/SLOPE	WATER EROSION POTENTIAL	WIND EROSION POTENTIAL	DESCRIPTION	AREA (acres)	SOIL RESTORATION POTENTIAL
Kiona stony silt loam, 15 to 45 percent slopes	Moderate	Low	This component is on hillslopes, hills. The parent material consists of loess and colluvium derived from basalt. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	69.8	Low
Rock outcrop	Not Rated	Not Rated	-	0.0	Not Rated
Rubble land-Rock outcrop-Kiona complex, 60 to 120 percent slopes	Not Rated	Not Rated	This component is on hillslopes. The parent material consists of colluvium from basalt and loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	67.4	Not Rated
Sohappy-Fortyday complex, 15 to 30 percent slopes	High	Moderate	The Fortyday component is on hillslopes, structural benches. The parent material consists of loess, colluvium and residuum from basalt. Depth to a root restrictive layer, bedrock, lithic, is 14 to 20 inches. The natural drainage class is well drained. The Sohappy component is on hillslopes. The parent material consists of loess over colluvium and alluvium. Depth to a root restrictive layer, bedrock, lithic, is 40 to 60 inches. The natural drainage class is well drained.	12.5	Low
Starbuck-Rock outcrop complex, 3 to 15 percent slopes	High	Moderate	This component is on structural benches. The parent material consists of loess and alluvium. Depth to a root restrictive layer, bedrock, lithic, is 12 to 20 inches. The natural drainage class is well drained.	99.9	Moderate
Timmerman complex, 2 to 5 percent slopes	Low	Moderate	The Timmerman component is on outwash plains, terraces. The parent material consists of glacial outwash and alluvium. In some portions of this component, depth to a root restrictive layer, strongly contrasting textural stratification, is 10 to 20 inches. In other places, depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	6.2	Low
Argids, strongly sloping	Low	Moderate	This component is on terraces. The parent material consists of alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	5.0	Low

MAP UNIT NAME/SLOPE	WATER EROSION POTENTIAL	WIND EROSION POTENTIAL	DESCRIPTION	AREA (acres)	SOIL RESTORATION POTENTIAL
Haploxerolls complex, 3 to 5 percent slopes	Moderate	Moderate	This component is on terraces. The parent material consists of alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	2.1	Moderate
Semal complex, 3 to 15 percent slopes	Moderate	Moderate	This component is on terraces. The parent material consists of loess and/or glacial outwash. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained.	13.8	Low
Water	Not Rated	Not Rated	-	54.1	Not Rated
Kiona stony silt loam, 15 to 45 percent slopes	Moderate	Low	This component is on hillslopes, hills. The parent material consists of colluvium from basalt and loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	1.1	Low
Drino-Disage-Kiona complex, 30 to 45 percent slopes	High	Low	The Kiona component is on hillslopes. The parent material consists of colluvium from basalt and loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. The Drino component is on hillslopes. The parent material consists of colluvium from basalt with loess. Depth to a root restrictive layer, bedrock, lithic, is 20 to 40 inches. The natural drainage class is well drained. The Disage component is on hillslopes, ridges. The parent material consists of residuum and colluvium from basalt with loess. Depth to a root restrictive layer, bedrock, lithic, is 14 to 20 inches. The natural drainage class is well drained.	4.2	Low
Esquatzel silt loam, 0 to 2 percent slopes	High	Moderate	This component is on terraces. The parent material consists of alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	43.2	Moderate
Esquatzel silt loam, 2 to 5 percent slopes	High	Moderate	This component is on terraces. The parent material consists of alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	32.8	Moderate

MAP UNIT NAME/SLOPE	WATER EROSION POTENTIAL	WIND EROSION POTENTIAL	DESCRIPTION	AREA (acres)	SOIL RESTORATION POTENTIAL
Esquatzel-Weirman complex, channeled, 0 to 2 percent slopes	Moderate	Moderate	The Esquatzel component is on terraces. The parent material consists of alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. The Weirman component is on flood plains. The parent material consists of alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat excessively drained.	4.0	Moderate
Fortyday-Nevo-Rock outcrop, 3 to 15 percent slopes	Moderate	Moderate	The Fortyday component is on hillslopes, structural benches. The parent material consists of loess, colluvium and residuum from basalt. Depth to a root restrictive layer, bedrock, lithic, is 13 to 20 inches. The natural drainage class is well drained. The Nevo component is on plateaus, hillslopes, ridges, structural benches. The parent material consists of loess and residuum from basalt. Depth to a root restrictive layer, bedrock, lithic, is 5 to 12 inches. The natural drainage class is well drained.	32.9	Low
Fortyday-Rubble land-Rock outcrop complex, 45 to 70 percent slopes	Not Rated	Not Rated	This component is on hillslopes, structural benches. The parent material consists of loess, colluvium and residuum from basalt. Depth to a root restrictive layer, bedrock, lithic, is 14 to 20 inches. The natural drainage class is well drained.	4.4	Not Rated
Kiona very stony loam, 45 to 60 percent slopes	High	Low	This component is on hillslopes. The parent material consists of colluvium from basalt and loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	22.1	Low
Malaga gravelly sandy loam, 5 to 10 percent slopes	Moderate	Moderate	This component is on terraces, escarpments. The parent material consists of glacial outwash. Depth to a root restrictive layer, strongly contrasting textural stratification, is 10 to 20 inches. The natural drainage class is somewhat excessively drained.	20.0	Low

MAP UNIT NAME/SLOPE	WATER EROSION POTENTIAL	WIND EROSION POTENTIAL	DESCRIPTION	AREA (acres)	SOIL RESTORATION POTENTIAL
Malaga cobbly sandy loam, 3 to 15 percent slopes	Moderate	Moderate	This component is on terraces, escarpments. The parent material consists of glacial outwash. Depth to a root restrictive layer, strongly contrasting textural stratification, is 10 to 20 inches. The natural drainage class is somewhat excessively drained.	58.2	Low
ROUTE SEGMENT 3C (AGENCY PREFERRED ALTERNATIVE)					
Adkins loamy fine sand, 5 to 15 percent slopes	Moderate	High	This component is on hillslopes, hills. The parent material consists of loess. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	20.6	Low
Quinton-Schawana complex, 5 to 20 percent slopes	Low	High	The Schawana component is on structural benches, hillslopes. The parent material consists of eolian deposits over residuum weathered from basalt. Depth to a root restrictive layer, bedrock, lithic, is 8 to 20 inches. The natural drainage class is somewhat excessively drained. The Quincy component is on hillslopes, hills. The parent material consists of eolian sands. Depth to a root restrictive layer, bedrock, lithic, is 20 to 40 inches. The natural drainage class is somewhat excessively drained.	80.7	Low
Royal loamy fine sand, 0 to 10 percent slopes	Moderate	High	This component is on terraces, hills. The parent material consists of sandy alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	6.7	Low
Royal very fine sandy loam, 2 to 5 percent slopes	Moderate	Moderate	This component is on terraces, hills. The parent material consists of sandy alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	4.2	Low
Rubble land-Rock outcrop complex	Not Rated	Low	-	2.6	Not Rated
Schawana cobbly loamy fine sand, 15 to 55 percent slopes	Low	High	This component is on structural benches, hillslopes. The parent material consists of eolian deposits over residuum weathered from basalt. Depth to a root restrictive layer, bedrock, lithic, is 8 to 20 inches. The natural drainage class is somewhat excessively drained.	42.2	Low

MAP UNIT NAME/SLOPE	WATER EROSION POTENTIAL	WIND EROSION POTENTIAL	DESCRIPTION	AREA (acres)	SOIL RESTORATION POTENTIAL
Schawana complex, 0 to 15 percent slopes	Low	High	This component is on structural benches, hillslopes. The parent material consists of eolian deposits over residuum weathered from basalt. Depth to a root restrictive layer, bedrock, lithic, is 8 to 20 inches. The natural drainage class is somewhat excessively drained.	33.1	Low
Scoon silt loam, 0 to 5 percent slopes	High	Moderate	This component is on terraces, alluvial fans. The parent material consists of loess. Depth to a root restrictive layer, duripan, is 10 to 20 inches. The natural drainage class is well drained.	5.0	Moderate
Scoon silt loam, 5 to 15 percent slopes	High	Moderate	This component is on terraces, alluvial fans. The parent material consists of loess. Depth to a root restrictive layer, duripan, is 10 to 20 inches. The natural drainage class is well drained.	5.0	Moderate
Taunton fine sandy loam, 2 to 5 percent slopes	Moderate	Moderate	This component is on alluvial fans, terraces. The parent material consists of alluvium and loess. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained.	0.0	Moderate
Timmerman loamy sand, 0 to 5 percent slopes	Low	High	This component is on terraces. The parent material consists of sandy glacial outwash and alluvium mixed with eolian material in the upper part. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat excessively drained.	47.5	Low
Timmerman coarse sandy loam, 0 to 2 percent slopes	Low	Moderate	This component is on terraces. The parent material consists of sandy glacial outwash and alluvium mixed with eolian material in the upper part. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat excessively drained.	2.4	Low
Timmerman coarse sandy loam, 5 to 10 percent slopes	Low	Moderate	This component is on terraces. The parent material consists of sandy glacial outwash and alluvium mixed with eolian material in the upper part. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat excessively drained.	8.0	Low

MAP UNIT NAME/SLOPE	WATER EROSION POTENTIAL	WIND EROSION POTENTIAL	DESCRIPTION	AREA (acres)	SOIL RESTORATION POTENTIAL
Torrifluvents, nearly level	High	Moderate	This component is on flood plains. The parent material consists of alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat excessively drained.	12.7	Low
Wanser-Quincy fine sands, 0 to 5 percent slopes	Low	High	The Quincy component is on dunes, terraces. The parent material consists of eolian sands. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat excessively drained. The Wanser component is on basin floors, flood plains. The parent material consists of alluvium and eolian sands. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained.	10.8	Low
Bakeoven very cobbly loam, 0 to 35 percent slopes	Moderate	Low	This component is on structural benches. The parent material consists of loess and residuum derived from basalt. Depth to a root restrictive layer, bedrock, lithic, is 4 to 10 inches. The natural drainage class is well drained.	19.4	Low
Winchester sand, 2 to 5 percent slopes	Low	High	This component is on terraces. The parent material consists of alluvium and/or eolian sands. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is excessively drained.	42.4	Low
Water	Not Rated	Not Rated	-	5.3	Not Rated
Burbank loamy fine sand, 0 to 5 percent slopes	Low	High	This component is on outwash terraces. The parent material consists of eolian sands over gravelly glacial outwash. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is excessively drained.	63.4	Low
Burbank loamy fine sand, 5 to 15 percent slopes	Low	High	This component is on outwash terraces. The parent material consists of eolian sands over gravelly glacial outwash. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is excessively drained.	11.2	Low

MAP UNIT NAME/SLOPE	WATER EROSION POTENTIAL	WIND EROSION POTENTIAL	DESCRIPTION	AREA (acres)	SOIL RESTORATION POTENTIAL
Burbank very cobbly loamy sand, 0 to 15 percent slopes	Low	Moderate	This component is on outwash terraces. The parent material consists of eolian sands over gravelly glacial outwash. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is excessively drained.	6.4	Low
Burbank stony loamy sand, 2 to 15 percent slopes	Low	High	This component is on outwash terraces. The parent material consists of eolian sands over gravelly glacial outwash. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is excessively drained.	14.5	Low
Ekrub fine sand, 0 to 25 percent slopes	Low	High	This component is on terraces. The parent material consists of eolian sands. Depth to a root restrictive layer, duripan, is 10 to 20 inches. The natural drainage class is somewhat excessively drained.	8.1	Low
Finley-Taunton complex, 0 to 5 percent slopes	Moderate	Moderate	The Finley component is on alluvial fans. The parent material consists of gravelly alluvium. Depth to a root restrictive layer, strongly contrasting textural stratification, is 20 to 40 inches. The natural drainage class is well drained. The Taunton component is on alluvial fans. The parent material consists of alluvium and loess. Depth to a root restrictive layer, duripan, is 20 to 40 inches. The natural drainage class is well drained.	11.7	Low
Kennewick silt loam, 0 to 2 percent slopes	High	Moderate	This component is on terraces. The parent material consists of lacustrine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	2.9	Low
Kennewick silt loam, 2 to 5 percent slopes	High	Moderate	This component is on terraces. The parent material consists of lacustrine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	6.5	Low
Kiona cobbly very fine sandy loam, 25 to 65 percent slopes	Moderate	Moderate	This component is on hillslopes, hills. The parent material consists of colluvium derived from loess and basalt. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained.	11.2	Low

MAP UNIT NAME/SLOPE	WATER EROSION POTENTIAL	WIND EROSION POTENTIAL	DESCRIPTION	AREA (acres)	SOIL RESTORATION POTENTIAL
Lickskillet very cobbly loam, 35 to 65 percent slopes	High	Low	This component is on hillslopes, hills. The parent material consists of colluvium derived from loess and basalt. Depth to a root restrictive layer, bedrock, lithic, is 12 to 20 inches. The natural drainage class is well drained.	4.0	Moderate
Prosser very fine sandy loam, 10 to 15 percent slopes	High	Moderate	This component is on hillslopes, structural benches. The parent material consists of loess. Depth to a root restrictive layer, bedrock, lithic, is 20 to 40 inches. The natural drainage class is well drained.	3.7	Low
Quincy sand, 5 to 25 percent slopes, eroded	Low	High	This component is on dunes. The parent material consists of eolian sands. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat excessively drained.	8.9	Moderate
Quincy fine sand, 2 to 15 percent slopes	Low	High	This component is on dunes, terraces. The parent material consists of eolian sands. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat excessively drained.	53.5	Moderate
Quincy loamy fine sand, 0 to 15 percent slopes	Moderate	High	This component is on dunes, terraces. The parent material consists of eolian sands. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat excessively drained.	126.5	Moderate
Quincy loamy fine sand, 15 to 35 percent slopes	Moderate	High	This component is on dunes, terraces. The parent material consists of eolian sands. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat excessively drained.	6.7	Moderate

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CHAPTER 4 ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This chapter describes the potential consequences, or impacts, on the environment that could result from the construction, operation and maintenance of the proposed 230 kilovolt (kV) transmission line. Also described are the effects of taking no action (No Action Alternative). The last sections in this chapter present an evaluation of cumulative effects, and irreversible and irretrievable commitment of resources.

4.1.1 Impact Assessment and Mitigation Planning

The potential environmental consequences from the Project were ascertained through a systematic analysis that included assessing impacts of the Project on the environment and then determining if these impacts could be mitigated.

Implementation of the proposed Project could impact or modify the existing condition of the environment. Impacts from the proposed Project can occur directly, indirectly, or cumulatively. Direct impacts are the result of the physical destruction or degradation of a resource potentially resulting from the proposed Project. An example of a direct impact is the removal and grading of grassland habitat during the construction of a road. Indirect impacts are foreseeable effects that are somewhat distant from the Project in time, space, or both. A common example of an indirect impact is the introduction and establishment of noxious weeds in newly disturbed soil.

In this analysis, short-term environmental effects predicated to occur during project construction that would be anticipated to return to a preconstruction condition at or within three to five years following construction were considered short-term impacts. Environmental effects that would be anticipated to remain for the life of the Project, approximately 50 years, were considered long-term impacts. Permanent impacts are those that would be anticipated to remain substantially for the life of the Project and beyond, including irreversible and irretrievable commitment of resources.

The intensity of the environmental effect also can vary. What constitutes a low, moderate, or high impact on a resource varies by resource and assumptions made regarding each. These impacts and impact levels (i.e., low, moderate or high) are described in the effects analysis section for each resource.

4.1.1.1 Identify Ground Disturbance

The purpose of the analysis was to determine the types and amount of ground disturbance that could occur based on the design criteria and typical specifications of the proposed facilities, construction techniques and equipment used, extent and duration of construction, requirements for operation of the transmission line and activities associated with routine maintenance. The majority of potential impacts that could occur would result from activities associated with construction, and includes the following:

- Upgrading existing access roads or constructing new roads for access where needed;
- Preparing structure sites;
- Assembling and erecting structures; and
- Stringing conductors (e.g., wire-pulling and splicing sites).

In addition, impacts on some resources would occur following construction from the presence of the transmission line and access roads. Also, periodic maintenance could cause short-term impacts.

The amount of ground that could be disturbed as the result of Project activities was estimated based on the typical design characteristics of the 230 kV project (Section 2.4.1). Short-term, long-term and access road (short- and long-term) disturbance was estimated and the disturbance model calculations and assumptions are presented in Chapter 2, Section 2.4.3.2. Short-term disturbance included structure work areas for the staging and installation of the tangent H-frame and single pole structures and the angle/dead end structures as well as the conductor pulling and tensioning sites. Long-term disturbance included H-frame, single pole, angle/dead end and lattice structure base areas as well as work pad areas in slopes over eight percent for equipment stability for structure installation.

Transmission line access for construction would be via a combination of new access roads, overland access, improvement to existing roads and use of existing terrain or roads as is. Where the proposed transmission line would parallel existing transmission lines or other linear utilities, the access roads along the existing utilities would be used wherever possible to minimize the amount of new access road construction. In some areas, only temporary roads would be needed. Long-term access roads would be constructed where needed for construction and long-term maintenance. Overland access would occur in areas where no grading would be needed and would be used to the greatest extent possible. Overland travel would consist of “drive and crush” and/or “clear and cut” travel. Drive and crush is vehicular travel to access a site without significantly modifying the landscape. Vegetation is crushed but not cropped. Soil is compacted but no surface soil is removed. Eight levels of access (levels 0 through 7) were developed, and numerically arraigned based on the anticipated ground disturbance expected, with the lowest level (Level 0) having the lowest level of ground disturbance and the highest level (Level 7) having the most.

The short-term, long-term and access road disturbance calculations by route segment and end to end route alternative are presented in Section 2.4.3.2 and Tables 2-5, 2-6, 2-7, and 2-8.

4.1.1.2 Assess Impacts

Based on the estimated ground disturbance associated with the Project (Chapter 2) and the resource inventory information reflecting the existing environment, each resource specialist determined the types, level, and amount of impacts that could occur on the resource. Computer-assisted models were developed to support this determination, which allowed the method used for each resource to be tailored to specific requirements and assumptions for analysis of each resource. Qualitative and quantitative variables of resource sensitivity, resource quantity, and estimated ground disturbance were considered in predicting the magnitude of impacts. Four levels were established and defined for each resource: high, moderate, low and no identifiable impact. A high impact could cause substantial change or stress to an environmental resource or use and would generally be considered a significant impact; a moderate impact could potentially cause some change or stress to an environmental resource or use ranging between a significant and insignificant impact and could be reduced through mitigation; a low impact could be a detectable but slight change or stress and would generally be considered an insignificant impact; and a no identifiable impact would be considered where there is no measurable impact to the resource. What constitutes a low, moderate, or high impact on a resource varies by resource as are the assumptions for analysis for each resource.

4.1.1.3 Identify Potential Mitigation Measures

Project design features and environmental protection measures described in Chapter 2 (Section 2.5) were incorporated into the Project design and would be implemented during construction and operation of the proposed Project. The measures were designed to avoid or minimize environmental impacts from Project construction, operation and maintenance activities. These are items that Pacific Power would be required to implement as part of the Project development. The project design features were developed in an iterative process that involved conducting the impact analysis and then adding standard operating procedures, environmental protection measures and best management practices to the proposed Project and alternatives as project design features to address identified impacts.

In certain cases, mitigation measures were identified following the impact assessment to reduce or minimize moderate or high impacts. Mitigation measures were developed in collaboration with the Bureau of Land Management (BLM) and cooperating agencies. Prior to the construction of the transmission line, the Proponent would coordinate with the BLM and other land management agencies and landowners to discuss the implementation of mitigation at specific locations or areas.

4.1.1.4 Assess Residual Impacts

Residual impacts are the environmental effects that remain after mitigation measures are applied. The locations of potential residual impacts were identified if possible. The intensities of such potential residual impacts anticipated to occur from implementation of an alternative along the reference centerline were assessed and discussed in the residual impacts discussion for each resource.

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4.2 VEGETATION AND SPECIAL STATUS PLANT SPECIES

4.2.1 Methods and Impact Types

4.2.1.1 Analysis Methods

The impact analysis for vegetation involved calculating the number of miles traversed by the transmission line route segments per vegetative cover type. Once the mileage was obtained, the rates of disturbance from the disturbance model were applied to these distances to generate estimates of the number of acres of impact per mile of transmission line by vegetation type. Refer to Chapter 2 for a description of the disturbance model.

Federally listed and proposed plant species, and designated and proposed critical habitat were analyzed in accordance with the Federal Endangered Species Act (ESA; 1973) and ESA Section 7 Consultation guidelines (USFWS and NMFS 1998). Other rare plant species of concern were analyzed following BLM 6840 Manual direction for special status species management (BLM 2008).

Pedestrian surveys for targeted special status plants were conducted on accessible federal lands with the 160 foot right-of-way (ROW) corridor. Federal lands comprise approximately 29 percent of the total ROW corridor; the remaining 71 percent is comprised of non-federal (state and private) land and was not surveyed. Of the 674 acres of federal lands within the 160 feet wide ROW corridor, 450 acres (67 percent) were accessible and surveyed (see Table 3.2-3). As not all land within the 160 foot ROW corridor was surveyed, the analysis for special status plants is based upon several assumptions. First, ROW clearance surveys on federal land will be completed prior to construction in areas that will be disturbed and that have potential suitable habitat for special status plants. Populations of special status plant species will be delineated on Project maps as “Avoidance Areas,” and will be marked in the field prior to the start of construction. If any new populations of special status plants are discovered on federal lands during Project surveys or construction, these findings will be reported within 48 hours to the authorized officer at the appropriate land management agency and will be treated the same as currently known populations. In cases where such species are identified, appropriate action will be taken to avoid adverse impacts on the species and their habitats. A plant protection plan will be developed identifying specific measures to protect special status plants. Protection measures could include timing restrictions, altering the placement of roads or structures, and the use of biological monitors to protect biological resources during construction. In situations where impacts to sensitive plants cannot be avoided by construction activities, transplanting of plants will be considered.

There may be undiscovered populations of special status plant species in areas that may be impacted by this Project. The baseline information provided in Chapter 3 has been used to determine impacts to each species and their habitat. Occurrence location information used for this analysis is from geographic information system (GIS) layers, as mapped by the Washington Natural Heritage Program (WNHP) and/or BLM. The WNHP GIS occurrence polygons include large buffers, so it is difficult to accurately determine if the occurrences truly intersect with areas of impact from this Project. For the purposes of this analysis, the assumption is made that the entire mapped area is occupied by the species.

4.2.1.2 Impact Criteria

Sensitivity classifications were assigned to vegetation resources that occur within the Project area. These sensitivity classifications served as the basis for the assigning of impact levels. Criteria used to assign resource sensitivity included species legal status (federally-listed and Candidate species; BLM and state sensitive species) and biologically important plant community (wetlands, riparian areas, aspen, and sagebrush). Table 4.2-1 summarizes the resource sensitivity classification for vegetation resources that occur in the Project area.

TABLE 4.2-1 VEGETATION RESOURCE SENSITIVITY CLASSIFICATIONS

VEGETATION RESOURCE	SENSITIVITY	POTENTIAL IMPACT FROM THE PROPOSED PROJECT
Riparian, Perennial Streams/Marsh	High	Reduction in sensitive habitat that is fragile and slow to recover from disturbance.
Sagebrush/Perennial Grassland	High	Reduction in quality habitat that supports sensitive obligate species and is slow to recover from disturbance.
Special Status Plant Species Occurrences	High	Disturb fragile populations of species and reduction in special status species habitat.
Trees (Aspen and Poplar)	High	Reduction in quality habitat that supports sensitive obligate species and is slow to recover from disturbance.
Basalt Cliffs	Moderate	Reduction in quality habitat that supports sensitive obligate species.
Riparian, Intermittent Stream	Moderate	Reduction in habitat (abundance and quality) that is slow to recover to pre-disturbance state.
Sagebrush and Rabbitbrush/Annual Grassland	Moderate	Reduction in habitat (abundance and quality) that is slow to recover to pre-disturbance state.
Annual and Perennial Grassland	Low	Reduction in habitat (abundance and quality).

4.2.1.3 Impact Types

Impacts to vegetation resources were measured on multiple scales. Impacts can vary in intensity from no change or only slightly discernible change, to a full modification of the environment. In addition to intensity there is duration. Duration was evaluated in terms of short-term and long-term impacts. The general types of impacts caused by the construction, operation, and maintenance of the Project are presented in Table 4.2-2.

Impacts can occur directly or indirectly and be short- or long-term. Direct impacts are the result of the physical destruction or degradation of a resource potentially resulting from the proposed Project. An example of a direct impact is the removal and grading of grassland habitat during the construction of a road. Indirect impacts are foreseeable effects that are somewhat distant from the Project in time, space, or both. A common example of an indirect impact is the introduction and establishment of noxious weeds in newly disturbed soil.

Impacts are considered short-term if they disturb vegetation, but do not prevent the reestablishment of vegetation communities to pre-impact functionality within five years. Impacts to grasslands are frequently considered short-term because these communities typically recover more quickly than plant communities possessing a woody component (Olson et al. 2000; Lesica et al. 2005). Long-term impacts continue for an extended period of years. Long-term impacts are impacts where a complete change in functionality occurs (e.g., land conversion) or where return to pre-impact conditions takes an extended time to occur (e.g., more than 50 years). Due to their woody component, long-term impacts can be expected in sagebrush dominated areas.

TABLE 4.2-2 SUMMARY OF IMPACTS TO VEGETATION RESOURCES

IMPACT	PROJECT ATTRIBUTE	POTENTIAL IMPACT AND VEGETATION RESOURCE EFFECT	LONGEVITY
Direct injury and/or mortality to vegetation	Vehicle and human trampling during construction and maintenance.	Destruction, mortality, and injury to vegetation, reduction in habitat quantity and quality. Potential disturbance and/or destruction of special status plants and/or habitat.	Short-term in areas adjacent to the ROW. Long-term in areas associated with clearing and grading for access roads and transmission structures.
Ground disturbance	Construction, tower foundations, access roads.	Habitat loss and reduction in habitat quality through the potential establishment of noxious weeds, increased erosion potential.	Short-term within the footprint from construction. Long-term from access roads and structures.
Fugitive dust generation	Construction, maintenance and repair activities	Reduced photosynthesis, impaired species respiration, reduction in habitat quality.	Short-term within the footprint from construction. Long-term from access roads.
Exposure to pollutants	Chemical spills from construction and maintenance.	Reduced survival, population and growth.	Short-term, localized to construction and maintenance sites.
Fire	Construction and maintenance equipment, human access.	Habitat loss and reduction in habitat quality through the potential post-fire establishment of noxious weeds.	Short-term in the construction footprint for the transmission line. Long-term for access roads.

4.2.2 Impact Levels (High, Moderate, Low, No Identifiable Impact)

Impact levels are based on habitats that occur along the assumed transmission line centerline (route number and milepost). Impact levels are assigned based on resource sensitivity, resource quality (context or the existing condition of the resource), resource quantity (the amount of the resource potentially affected), and the type and duration of impact (short- or long-term). These criteria were applied to develop impact level categories of high, moderate, low and no identifiable.

High – A high level of impact would result if the construction, operation, or maintenance of the proposed Project would potentially cause a significant or substantial adverse change or stress to vegetation resources that have a high sensitivity.

Moderate – A moderate level of impact would result if the construction, operation, or maintenance of the proposed Project would potentially cause some adverse change or stress (ranging between significant and insignificant) to vegetation resources that have moderate sensitivity.

Low - A low level of impact would result if the construction, operation, or maintenance of the proposed Project would potentially cause an insignificant or minor adverse change or stress to vegetation resources that have low sensitivity.

No Identifiable - No identifiable impact would be indicated where no measurable impact would occur to vegetation resources.

4.2.3 Impacts Common to All Route Segments

4.2.3.1 General Vegetation

The proposed Project would directly affect vegetation communities through the temporary trampling of herbaceous vegetation, the partial removal of aboveground plant cover, and the complete removal of vegetation due to construction of the transmission line, access roads and temporary work spaces. Vegetation would be permanently removed and disturbed at structure bases and along permanent access roads. Vegetation removal could have a variety of effects on vegetation communities including changes in community structure and composition. The degree of impact depends on the type and amount of vegetation affected and the rate at which vegetation would regenerate after construction. In addition, removal of vegetation can reduce or change the functional qualities of vegetation for wildlife habitat (see Section 4.3 Wildlife and Special Status Wildlife Species). Within the Project area, the recovery of vegetation following revegetation would vary by plant community type following construction. Grasslands and herbaceous wetlands would generally recover within five to seven years; while shrublands, including sagebrush and rabbitbrush, may require 30 to 50 years (Olson et al. 2000; Lesica et al. 2005). Project design features will be implemented during construction and operation, and are anticipated to be effective at minimizing the amount vegetation that will be impacted (refer to Section 2.5 Project Design Features Common to Action Alternatives). Project design features include: maintaining intact vegetation wherever possible; minimizing the blading of native plant communities during construction, consistent with safe construction practices; utilizing overland travel where feasible; and reseeding disturbed areas as detailed in the Plan of Development (POD).

Ground disturbance and vegetation removal can indirectly increase the potential for the introduction and spread of noxious weeds and invasive weeds (Olson 1999; Levine et al. 2003). Non-native plant invasions have the potential to change the composition and diversity of native plants through competition, altering the natural fire regime, and by changing ecosystem processes (e.g., nitrogen cycling). Construction of access roads and the movement of construction equipment and other vehicles along these roads would increase the potential for the spread of noxious weeds in the affected areas (Sheley et al. 1999; Gelbard and Belnap 2003). Non-native plants, such as cheatgrass, create a more continuous fuel bed than native bunchgrasses, resulting in an increase in fire frequency and intensity (Brown 2000; Paysen et al. 2000). See Section 4.12 Wildland Fire Ecology and Management for more information on potential wildland fire impacts. Project design features will be implemented to eliminate the spread of noxious weeds and invasive species from Project activities and include the following: reseeding disturbed areas with certified weed-free materials (e.g., seed, borrow material, straw waddles and bale barriers); washing all equipment before entering the Project area and when leaving areas where noxious weeds are present; closing or rehabilitating new or improved access roads that are not required for maintenance; developing and incorporating a fire prevention plan into the POD; and complying with all federal, state and county noxious weed control regulations and guidelines. In addition, a Noxious Weed and Invasive Plant Management Plan will be developed in consultation with land management agencies and local weed control districts, and will be incorporated into the final POD.

Riparian areas can be particularly vulnerable to disturbance. The removal of vegetation along waterways can cause an increase in water temperature, an increase water velocity, and decrease wildlife habitat. Disturbance of soil in or near riparian areas may lead to erosion of the streambank and increase the deposition of sediment into waterways. In addition, removal of protective vegetation could also expose soil to potential wind and water erosion. This can result in further loss of soil and vegetation, as well as an increase in sediment input to water resources. Impacts to soil and geology are discussed in Section 4.15 Soils and Geology, impacts to water resources are described in Section 4.14 Water Resources, and Section 4.3 Wildlife and Special Status Wildlife Species discusses impacts to wildlife. Measures to reduce impacts to riparian areas include: avoiding riparian areas and wetlands, where possible; and minimizing disturbance to drainage channels and stream banks.

Finally, indirect effects could result from the fragmentation of connected vegetation types. Fragmentation refers to the breaking up of the contiguous areas of vegetation into smaller patches, which results in the creation of habitat edges (areas where two or more vegetation types meet) along the ROW. Edge areas have different microclimatic conditions and structure, which may lead to different species composition than the interior area (Saunders et al. 1991). Edge effects are typically more dramatic in forest and woodland vegetation communities compared with shrubland and grassland communities. As plant communities become smaller and more fragmented, they become more susceptible to outside influences such as invasive weed species. Habitat loss, degradation and fragmentation has already occurred in the Project area by other transmission lines, roads, highways and interstates, Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) training operations, non-native plant invasions, fire, alteration by livestock grazing and conversion of sagebrush steppe to residential and agricultural land (JBLM YTC 2002; Rice et al. 2008; Shaw et al. 1999). Project design features will be implemented during construction and operation, and are anticipated to be effective at reducing further degradation of habitat (refer to Section 2.5 Project Design Features Common to Action Alternatives). Project design features include: maintaining intact vegetation wherever possible; minimizing the blading of native plant communities during construction, consistent with safe construction practices; utilizing overland travel where feasible; implementing noxious weed control measures; closing or rehabilitating new or improved access roads that are not required for maintenance; and reseeding disturbed areas as detailed in POD.

4.2.3.2 Special Status Plants

Special status plants may be directly or indirectly impacted by construction activities. They can be directly impacted when the plants or their habitats are destroyed or altered in a way such that they can no longer survive. Special status plants growing outside the construction zone could be indirectly impacted if the effects of construction activities degrade their habitat. This could occur through soil erosion, invasion by non-native species, increased off-highway vehicle (OHV) usage, and an increase in fire (Olson 1999; Ouren et al. 2007). Pedestrian surveys for targeted special status plants were conducted on accessible federal lands with the 160 foot ROW corridor. Federal lands comprise approximately 29 percent of the total ROW corridor; the remaining 71 percent is comprised of non-federal (state and private) land and was not surveyed. Of the 674 acres of federal lands within the 160 feet wide ROW corridor, 450 acres (67 percent) were accessible and surveyed (see Table 3.2-3). As not all land within the route segment corridors was surveyed, impacts could occur to special status plant species. In addition to project design features described above to reduce impacts to general vegetation, the following project design features would be implemented during construction and maintenance to minimize impacts to special status plants: adhering to mitigation measures developed during the consultation period under Section 7 of the ESA (1973) as specified by the U.S. Fish and Wildlife Service (USFWS); taking appropriate action (e.g., avoiding or spanning areas supporting plants, transplanting), to avoid adverse impacts on identified special status species and their habitats; marking populations of special status plants for avoidance during construction; and developing a plant protection plan to identify specific measures for the protection of special status plants. Impacts to federal threatened, endangered and candidate species are discussed below and impacts to state-listed and BLM sensitive species are discussed further by route segment.

Effects Determination

Effects determinations for BLM Sensitive and federally listed species that occur or have the potential to occur in the Project area is based on: known occurrence in the proposed Project area; surveys that were conducted during the appropriate time of the year by qualified botanists; available suitable habitat in surveyed and unsurveyed areas; potential impacts from the proposed Project; and known range and rarity (Table 4.2-3).

Federally Threatened, Endangered and Candidate Species

There are no known occurrences of federally listed, proposed or candidate species within any of the route segments. Three candidate and two listed species are known or suspected to occur within the region the Project is located in. Impacts to these species are discussed below.

Umtanum desert buckwheat

The entire known range of Umtanum desert buckwheat is on federally owned land in the Hanford National Monument, Washington. Other potential locations within the lower Columbia River Basin were intensively searched for additional populations in 1996 and 1997; however no other populations were found (USFWS 2010c). Potential threats to Umtanum desert buckwheat include fire, OHV use, low germination rates and high seedling mortality (USFWS 2010c). No occurrences of this species were found during the special status plant surveys, and it is unlikely to occur in the Project area. No effects are anticipated to occur to this species with the construction of the proposed Project.

Ute Ladies'-Tresses

Ute ladies'-tresses is known to occur in Colorado, Idaho, Montana, Nebraska, Nevada, Utah, Washington, and Wyoming. In Washington, there are four known populations: three small occurrences near the Columbia River in Chelan County and one occurrence in Okanogan County (USFWS 1995). The USFWS is currently in a review period to consider whether delisting Ute ladies'-tresses is warranted (USFWS 2004b). The riparian habitat on which Ute ladies'-tresses depends has been drastically modified by urbanization and agriculture and development. Habitat loss or degradation from competition from non-native plants and vegetation succession are the most widespread threats. No occurrences of this species were found during the special status plant surveys in May, June or August. An effects determination of may affect, not likely to adversely affect was made for all route segments because limited potential habitat is present. Wetlands and the area immediately adjacent to the Columbia River would be avoided. In addition, project design features that have been incorporated into the Project are anticipated to minimize impacts to special status species. Project design features include: adhering to mitigation measures developed during the consultation period under Section 7 of the ESA (1973) as specified by the USFWS; taking appropriate action (e.g., avoiding or spanning areas supporting plants, transplanting) to avoid adverse impacts on identified special status species and their habitats; marking populations of special status plants for avoidance during construction; and developing a plant protection plan to identify specific measures for the protection of special status plants. It is anticipated that no impacts would occur to Ute ladies'-tresses or its habitat.

Wenatchee Mountain Checker-Mallow

The known historical and current range of Wenatchee Mountain checker-mallow is restricted to Chelan County, Washington. The historical range covered an area approximately 11 by 3 miles and extended southeast of Leavenworth, Washington. Currently five populations are known to occur (USFWS 2004a). Wenatchee Mountain checker-mallow is typically associated with moist meadows and open conifer stands; however known populations are associated with a drainage ditch and along the shoulder of a forest road (USFWS 2004a). The nearest population is approximately 50 miles north of the Project area. No occurrences of this species were found during the special status plant surveys in May, June or August. Primary threats include hydrological disturbance, ground disturbance associated with timber harvest, development and agriculture, competition from non-native grasses, fire, infestation by aphids, and livestock (USFWS 2004a). An effects determination of may affect, not likely to adversely affect was made for all route segments because limited potential habitat is present, primarily associated with canals, intermittent and perennial streams, and the Columbia River. Wetlands and the area immediately adjacent to the Columbia River would be avoided and canals, drainage ditches, and riparian areas would be spanned, where practicable. In addition, project design features that have been incorporated into the

Project are anticipated to minimize impacts to special status species. Project design features include: adhering to mitigation measures developed during the consultation period under Section 7 of the ESA (1973) as specified by the USFWS; taking appropriate action (e.g., avoiding or spanning areas supporting plants, transplanting) to avoid adverse impacts on identified special status species and their habitats; marking populations of special status plants for avoidance during construction; and developing a plant protection plan to identify specific measures for the protection of special status plants. It is anticipated that no impacts would occur to Wenatchee Mountain checker-mallow or its habitat.

White Bluffs bladderpod

Only one population of White Bluffs bladderpod is known to occur. This population is restricted to the upper edge of the White Bluffs of the Columbia River in Franklin County, Washington, which is outside the Project area (USFWS 2010b). Primary threats include landslides in the White Bluffs, infestation of nonnative weeds; OHV use and wildland fire. No occurrences of this species were found during the special status plant surveys in May, June or August. An effects determination of no effects was made for all route segments except for Route Segment 3a, 3b, and 3c. For these route segments an effects determination of may affect, not likely to adversely affect was made; however it is highly unlikely that suitable habitat is present along the Columbia River. Project design features that have been incorporated into the Project are anticipated to minimize impacts to special status species. Project design features include: adhering to mitigation measures developed during the consultation period under Section 7 of the ESA (1973) as specified by the USFWS; taking appropriate action (e.g., avoiding or spanning areas supporting plants, transplanting) to avoid adverse impacts on identified special status species and their habitats; marking populations of special status plants for avoidance during construction; and developing a plant protection plan to identify specific measures for the protection of special status plants. It is anticipated that no impacts would occur to White Bluffs bladderpod or its habitat.

Wormskiold's Northern Wormwood

There are two known existing occurrences of Wormskiold's northern wormwood. These occurrences are located approximately 202 river miles apart along the Columbia River in Washington (USFWS 2011). Primary threats to Wormskiold's northern wormwood include altered water regimes, erosion, trampling, off-road vehicle compaction, and exotic species invasions. Historically known populations and suitable habitat in Washington and in Oregon have been lost due to dam construction (USFWS 2011). No occurrences of this species were found during the special status surveys in May, June or August, but one of the existing populations is known to occur within one mile of Route Segments 3b and 3c. An effects determination of no effects was made for all route segments except for Route Segments 3a, 3b, and 3c. For these route segments an effects determination of may affect, not likely to adversely affect was made; however, no impacts to potential habitat are anticipated because no structure or road construction work would occur within the Columbia River. Project design features that have been incorporated into the Project are anticipated to minimize impacts to special status species. Project design features include: adhering to mitigation measures developed during the consultation period under Section 7 of the ESA (1973) as specified by the USFWS; taking appropriate action (e.g., avoiding or spanning areas supporting plants, transplanting) to avoid adverse impacts on identified special status species and their habitats; marking populations of special status plants for avoidance during construction; and developing a plant protection plan to identify specific measures for the protection of special status plants. It is anticipated that no impacts would occur to Wormskiold's northern wormwood or its habitat.

TABLE 4.2-3 EFFECTS DETERMINATION FOR BLM SENSITIVE AND FEDERALLY LISTED SPECIES THAT OCCUR OR HAVE THE POTENTIAL TO OCCUR IN THE PROJECT AREA

COMMON NAME	SCIENTIFIC NAME	LEGAL STATUS	EFFECTS DETERMINATION BY ROUTE SEGMENT[1]									
			1a	1b	2c	2a	2b	2c	2d	3a	3b	3c
Awned halfchaff sedge	*Lipocarpha aristulata*	BLM-S	NE	NE	NE	NE	NE	NE	MIN	MIN	MIN	MIN
Beaked cryptantha	*Cryptantha rostellata*	BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Bristle-flowered collomia	*Collomia macrocalyx*	BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Caespitose evening-primrose	*Oenothera caespitosa* ssp. *caespitosa*	BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Columbia cress	*Rorippa columbiae*	BLM-S	NE	NE	NE	NE	NE	NE	NE	MIN	MIN	MIN
Columbia milkvetch	*Astragalus columbianus*	BLM-S	NE	NE	NE	NE	NE	NE	NE	MIN	MIN	MIN
Dwarf evening-primrose	*Camissonia pygmaea*	BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Fuzzytongue penstemon	*Penstemon eriantherus var. whitedii*	BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Geyer's milk-vetch	*Astragalus geyeri*	BLM-S	NE	NE	NE	NE	NE	NE	NE	MIN	MIN	MIN
Grand redstem	*Ammannia robusta*	BLM-S	NE	NE	NE	NE	NE	NE	NE	MIN	MIN	MIN
Gray cryptantha	*Cryptantha leucophaea*	BLM-S	NE	NE	NE	NE	NE	NE	MIN	MIN	MIN	MIN
Hedgehog cactus	*Pediocactus simpsonii var. robustior*	BLM-STR	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Hoover's desert-parsley	*Lomatium tuberosum*	BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Hoover's tauschia	*Tauschia hooveri*	BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Naked-stemmed evening-primrose	*Camissonia scapoidea ssp. scapoidea*	BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Nuttall's sandwort	*Minuartia nuttallii* ssp. *fragilis*	BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Piper's daisy	*Erigeron piperianus*	BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Snake River cryptantha	*Cryptantha spiculifera*	BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Umtanum desert buckwheat	*Eriogonum codium*	C	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Ute ladies'-tresses	*Spiranthes diluvialis*	T	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN
Wanapum crazyweed	*Oxytropis campestris var. wanapum*	BLM-S	NE	NE	NE	NE	NE	NE	NE	NE	NE	MIN
Wenatchee Mountain checker-mallow	*Sidalcea oregana* var. *calva*	E	MN	MN	MN	MN	MN	MN	MN	MN	MN	MN
White Bluffs bladderpod	*Physaria douglasii* ssp. *tuplashensis*	C	NE	NE	NE	NE	NE	NE	NE	MN	MN	MN
White eatonella	*Eatonella nivea*	BLM-S	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
Wormskiold's northern wormwood	*Artemisia borealis* var. *wormskioldii*	C, BLM-S	NE/NE	NE/NE	NE/NE	NE/NE	NE/NE	NE/NE	NE/NE	MN/MIN	MN/MIN	MN/ MIN

[1]For BLM Sensitive Species: NE=No effect; MIN=May impact individuals or populations, but will not contribute a trend toward federal listing; MIM=May impact individuals or populations, and may contribute a trend towards federal listing. For Federally Listed Species: NE=No effect; MN=May affect, not likely to adversely affect; ML=May affect, likely to adversely affect.

4.2.4 Impacts Specific to Route Segments

Long-term impacts to vegetation were assessed for each route segment and are presented in Table 4.2-4. Impacts for each route segment are discussed in detail in the following sections. Impacts to agricultural land, disturbed/developed areas and water are discussed in detail in Land Jurisdiction and Land Use (Section 4.4), Water Resources (Section 4.14), and Soil and Geology (Section 4.15) and are not discussed in this section.

4.2.4.1 Route Segment 1a (Agency Preferred Alternative)

General Vegetation

Construction of Route Segment 1a would result in approximately 1.3 acres of long-term ground disturbance to vegetation communities (Table 4.2-4). Long-term disturbance to vegetation communities would occur in areas classified as annual grasslands (0.9 acre) and big sagebrush/perennial grasslands (0.4 acre). Short-term disturbance would occur to approximately 7.5 acres of vegetation. Short-term disturbance would occur in work areas, turn around areas, and pulling and tensioning sites. Refer to Chapter 2 for a description of these sites. Impacts to vegetation along this route segment are similar to those described above for all route segments (Section 4.2.3) and include vegetation removal, introduction and spread of noxious weeds and invasive weeds, and fragmentation of connected vegetation types. Disturbance would be minimized by project design features (Chapter 2) designed to reduce impacts to vegetation resources. Project design features include using existing roads to access structure sites where practicable, minimizing blading and disturbance to plant communities, revegetating following construction and implementing a Noxious Weed Control Plan. With the implementation of project design features, long-term impacts to vegetation from the construction of Route Segment 1a include 0.6 mile of no identifiable, 1.1 miles of low impacts and 0.5 mile of moderate impacts. Short-term disturbance would occur to approximately 7.5 acres of vegetation.

Special Status Species and Priority Habitats

No special status plant species are known to occur along Route Segment 1a (Table 4.2-5). No known WNHP priority ecosystems would be disturbed through construction of Route Segment 1a. One-hundred percent of federal lands (4.5 acres) within this route segment were surveyed for special status plants; however, the majority of Route Segment 1a is comprised of non-federal land (39.4 acres) and was not surveyed (Table 3.2-3). As not all land within the route segment corridors was surveyed, impacts could occur to special status plant species. Long-term disturbance could occur to potential habitat for special status plants, including 0.4 acre of suitable, 0.8 acre of marginal and 0.4 acre unsuitable habitat. In addition to project design features described above to reduce impacts to general vegetation, the following project design features would be implemented during construction and maintenance to minimize impacts to special status plants: adhering to mitigation measures developed during the consultation period under Section 7 of the ESA (1973) as specified by the USFWS; taking appropriate action (e.g., avoiding or spanning areas supporting plants, transplanting) to avoid adverse impacts on identified special status species and their habitats; marking populations of special status plants for avoidance during construction; and developing a plant protection plan to identify specific measures for the protection of special status plants. With the implementation of project design features described above, impacts to special status plant species, potential suitable habitat, and WNHP priority ecosystems is anticipated to include 1.7 miles of low impacts and 0.5 mile of moderate impacts.

4.2.4.2 Route Segment 1b (Agency Preferred Alternative)

General Vegetation

Construction of Route Segment 1b would result in long-term disturbance of approximately 10.5 acres of vegetation. The majority of disturbance, 5.1 acres, would occur in areas classified as sagebrush/perennial grassland (Table 4.2-4). Long-term disturbance would also occur to annual (1.7 acres) and perennial (3.1 acres) grasslands, rabbitbrush/annual grasslands (0.5 acre), and aspen (0.1 acre). Impacts are similar to those described above for Route Segment 1a. Disturbance would be minimized by project design features (Chapter 2) designed to reduce impacts to vegetation resources. Project design features include using existing roads to access structure sites, minimizing blading and disturbance to plant communities, revegetating following construction and implementing a Noxious Weed Control Plan. With the implementation of project design features, long-term impact levels for Route Segment 1b include 1.1 miles of no identifiable, 5.0 miles of low, and 6.4 miles of moderate impacts. Short-term disturbance would occur to approximately 42.6 acres of vegetation.

Special Status Species and Priority Habitats

No federally-listed plants are known to occur along Route Segment 1b (Table 4.2-5). No WNHP priority ecosystems are known to occur and would be disturbed through construction of Route Segment 1b. Approximately 57 percent (138.2 acres) of federal lands within this route segment were surveyed for special status plants (Table 3.2-3). The remaining un-surveyed area consisted of 103.7 acres of inaccessible federal lands and 1.9 acres of non-federal lands. As not all land within the route segment corridors was surveyed, impacts could occur to special status plant species. Long-term disturbance would occur to potential habitat for special status plants, including 5.1 acres of suitable, 5.3 acres of marginal and 0.7 acre unsuitable habitat. Project design features described above for Route Segment 1a would also be implemented during construction and maintenance of Route Segment 1b to minimize impacts to special status plants and include: adhering to mitigation measures developed during the consultation period with the USFWS; avoiding or spanning areas supporting special status plants, where practicable; marking populations of special status plants for avoidance during construction; and developing a plant protection plan as part of the POD to identify specific measures for the protection of special status plants. With the implementation of project design features, impacts to special status plant species, potential suitable habitat, and WNHP priority ecosystems is anticipated to include 1.1 miles of no identifiable impacts (e.g., developed and agricultural land), 5.0 miles of low impacts and 6.4 miles of moderate impacts.

Nuttall's Sandwort

Nuttall's sandwort is a BLM Sensitive and a Washington Threatened Species. This species is found in Oregon, California, Nevada, and Grant County Washington. Within the region, two populations occupying approximately 884 acres are known to occur. One occurrence of Nuttall's sandwort was documented during the special status plant surveys along Route Segment 1b. This occurrence consisted of approximately 10 individuals scattered throughout 34 square feet. As all potential habitat was not surveyed, additional Nuttall's sandwort occurrences could be present. General threats to this species are primarily from OHV use (WNHP and BLM 2005). For the proposed Project, direct impacts to Nuttall's sandwort could occur due to habitat loss from ground disturbance, injury and/or mortality from vehicle and human trampling during construction and maintenance and increased OHV activity. Indirect impacts could occur through the degradation in habitat quality through the establishment of noxious weeds and invasive plants (e.g., cheatgrass) and increased wildland fire. In addition to project design features described above, the following project design features would be also be implemented to reduce direct and indirect impacts to Nuttall's sandwort from the proposed Project: maintain intact vegetation wherever possible; minimize the blading of native plant communities during construction, consistent with safe construction practices; utilize overland travel where feasible; reseed disturbed areas using an Agency approved mixture of native and non-native species or seed for revegetation as detailed in POD; and develop and incorporate a Noxious Weed and Invasive Plant Management Plan and a Fire Protection and Control Plan into the final POD. Approximately 0.1 acre of disturbance is anticipated to occur in this location, less than 0.1 percent of the known occupied habitat of Nuttall's sandwort in the region. However it was assumed that this occurrence will be spanned and no construction activities will disturb this occurrence. With the implementation of project design features described above and the assumption that this occurrence will be spanned, Project construction, operation and maintenance could cause some change or stress to the occurrence of Nuttall's sandwort (moderate impact) but will not contribute a trend toward federal listing.

Hedgehog Cactus

Hedgehog cactus is a BLM Strategic and Washington Sensitive Species (ISSSSP 2011). Hedgehog cactus ranges from eastern Washington to Nevada. In Washington, it has been found in Yakima, Kittitas, Chelan, Douglas, and Grant counties. At the regional level, fourteen populations occupying approximately11,895 acres are known to occur. Two occurrences of hedgehog cactus were documented during the special status plant survey along Route Segment 1b. This species was not determined to be a special status plant until after the surveys were complete, therefore its mapped location is based on field notes and retrospective mapping. As such, information on number of individuals and acres occupied was not collected. As all potential habitat was not surveyed, additional hedgehog cactus occurrences could be present. The primary threat to hedgehog cactus is collecting by cactus collectors (WNHP and BLM 2005). Direct impacts to hedgehog cactus are similar to those described for Nuttall's sandwort. For the proposed Project, direct impacts to hedgehog cactus could occur due to habitat loss from ground disturbance, injury and/or mortality from vehicle and human trampling during construction and maintenance, and increased OHV activity. Indirect impacts could occur through the degradation in habitat quality through the establishment of noxious weeds and invasive plants (e.g., cheatgrass) and increased wildland fire. In addition to project design features described above, the following project design features would be also be implemented to reduce direct and indirect impacts to hedgehog cactus from the proposed Project: maintain intact vegetation wherever possible; minimize the blading of native plant communities during construction, consistent with safe construction practices; utilize overland travel where feasible; reseed disturbed areas using an Agency approved mixture of native and non-native species or seed for revegetation as detailed in POD; and develop and incorporate a Noxious Weed and Invasive Plant Management Plan and a Fire Protection and Control Plan into the final POD. In addition, closing access roads that are not required for operation and maintenance would minimize potential impacts from cactus collectors. Approximately 0.3 acre of disturbance is anticipated to occur in this location, less than 0.1 percent of the known occupied habitat of hedgehog cactus in the region. However it was assumed that these occurrences will be spanned and construction activities would avoid these occurrences. With the implementation of project design features described above and the assumption that occurrences will be spanned and avoided, Project construction, operation and maintenance activities could cause some change or stress to the occurrence of hedgehog cactus (moderate impact) but will not contribute a trend toward federal listing.

Hoover's Tauschia

Hoover's tauschia is a federal species of concern, BLM Sensitive and Washington Sensitive Species (ISSSSP 2011). Hoover's desert-parsley is endemic to Washington and is known only from Yakima County and adjacent portions of Benton, Grant, and Kittitas counties (WNHP and BLM 2005). Within the region, twenty-eight populations occupying approximately 13,911 acres are known to occur. An occurrence of Hoover's tauschia is known to occur within one mile of Route Segment 1b. Potential threats to Hoover's tauschia include loss and degradation of habitat through orchard expansion and housing, grazing, OHV use and road construction. Fire is typically not a threat because Hoover's tauschia sites generally do not have enough vegetation present to carry a fire (WNHP and BLM 2005). Direct impacts and project design features that would be implemented to minimize impacts to potential occurrences of Hoover's tauschia are similar to those described for Nuttall's sandwort. With the implementation of project design features described above and the assumption that any occurrences found during pre-construction surveys will be spanned and avoided, Project construction, operation and maintenance activities could cause some change or stress to the Hoover's tauschia (moderate impact) but will not contribute a trend toward federal listing.

4.2.4.3 Route Segment 1c

General Vegetation

Route Segment 1c parallels Route Segment 1b for the majority of the route segment. Long-term disturbance to approximately 22.2 acres of land (Table 4.2-4) would occur with the construction of Route Segment 1c. Over half of the long-term disturbance, 13.6 acres, would occur in areas classified as annual grasslands. Construction would result in the long-term disturbance of 5.9 acres of sagebrush/perennial grassland, small amounts of intermittent stream/gully (0.1 acre), perennial grassland (2.0 acres), and rabbitbrush/annual grasslands (0.6 acre). Impacts are similar to those described above for Route Segment 1a. Disturbance would be minimized by project design features (Chapter 2) described above that are designed to reduce impacts to vegetation resources. Project design features include using existing roads to access structure sites, minimizing blading and disturbance to plant communities, revegetating following construction and implementing a Noxious Weed Control Plan. Impact levels for Route Segment 1c include 0.8 mile of no identifiable impacts, nine miles of low and 3.1 miles of moderate impacts. Approximately 43.5 acres of vegetation would be temporarily disturbed.

Special Status Species and Priority Habitats

No special status plant species or priority ecosystems are known to occur along Route Segment 1c (Table 4.2-5); however WNHP data indicates that Hoover's tauschia is known to occur within one mile of Route Segment 1c. One-hundred percent (1.7 acres) of federal lands within this route segment were surveyed for special status plants; however, the majority of Route Segment 1c is comprised of non-federal land (249.6 acres) and was not surveyed (Table 3.2-3). As not all land within the route segment corridors was surveyed, impacts could occur to special status plant species. Long-term disturbance would occur to potential habitat for special status plants, including 6.0 acres of suitable, 16.0 acres of marginal and 0.8 acre unsuitable habitat. Project design features described above for Route Segment 1a would also be implemented during construction and maintenance of Route Segment 1c to minimize impacts to special status plants and include: adhering to mitigation measures developed during the consultation period with the USFWS; avoiding or spanning areas supporting special status plants, where practicable; marking populations of special status plants for avoidance during construction; and developing a plant protection plan as part of the POD to identify specific measures for the protection of special status plants. With the implementation of project design features, impacts to special status plant species, potential suitable habitat, and WNHP priority ecosystems is anticipated to include 1.2 miles of no identifiable impacts (e.g., developed and agricultural land), 8.5 miles of low impacts and 3.2 miles of moderate impacts.

Hoover's Tauschia

WNHP data indicates that Hoover's tauschia is known to occur within one mile of Route Segment 1c. Direct impacts and project design features that would be implemented to minimize impacts to potential occurrences Hoover's tauschia are similar to those described above for Route Segment 1b. With the implementation of project design features described above and the assumption that any occurrences found during pre-construction surveys will be spanned and avoided, Project construction, operation and maintenance activities could cause some change or stress to the Hoover's tauschia (moderate impact) but will not contribute a trend toward federal listing.

4.2.4.4 Route Segment 2a (Agency Preferred Alternative)

General Vegetation

Construction of Route Segment 2a would disturb approximately 2.1 acres of land on a long-term basis (Table 4.2-4). Disturbance along this short segment would occur in annual (1.9 acres) and perennial (0.2 acre) grasslands. Impacts and project design features designed to reduce impacts are similar to those described for Route Segment 1a. The impact level for the entire segment would be low (1.0 mile). Short-term disturbance would occur to approximately four acres of vegetation.

Special Status Species and Priority Habitats

No special status plant species or priority ecosystems are known to occur along Route Segment 2a (Table 4.2-5). The entirety of Route Segment 2a is comprised of non-federal land (19.3 acres) and was not surveyed (Table 3.2-3). As land within the route segment corridors was not surveyed, impacts could occur to special status plant species. Long-term disturbance would occur to 2.1 acres of habitat suitable for special status plants. Project design features described above for Route Segment 1a would also be implemented during construction and maintenance of Route Segment 2a to minimize impacts to special status plants. With the implementation of project design features, low level impacts for special status plant species, potential suitable habitat, and WNHP priority ecosystems is anticipated to occur with the construction of Route Segment 2a.

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TABLE 4.2-4 LONG-TERM DISTURBANCE TO VEGETATION BY ROUTE SEGMENT

	VEGETATION TYPE (LINEAR MILES CROSSED, ACRES DISTURBED, AND % OF VEGETATION TYPE DISTURBED BY TOTAL ROUTE SEGMENT)[1]																								TOTAL LONG-TERM DISTURBANCE[2]	
ROUTE SEGMENT	ANNUAL GRASSLAND			INTERMITTENT STREAM/GULLY			PERENNIAL GRASSLAND			RABBITBRUSH/ ANNUAL GRASSLAND			RIPARIAN			SAGEBRUSH/ ANNUAL GRASSLAND			SAGEBRUSH/ PERENNIAL GRASSLAND			TREES (ASPEN & POPLAR)			TOTAL MILES OF VEGETATION DISTURBED	TOTAL ACRES OF VEGETATION DISTURBED
	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac
1a* 2.2 miles	1.2	0.9	53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	0.4	23	0	0	0	1.7	1.3
1b* 12.5 miles	1.8	1.7	15	0	0	0	2.8	3.1	28	0.5	0.5	5	0	0	0	0	0	0	6.3	5.1	45	0.1	0.1	1	11.5	10.5
1c 12.9 miles	7.3	13.6	59	0.1	0.1	0	1.0	2.0	9	0.3	0.6	3	0	0	0	0	0	0	3.1	5.9	26	0	0	0	11.8	22.2
2a* 1.0 mile	0.9	1.9	90	0	0	0	0.1	0.2	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	2.1
2b 16.4 miles	3.2	5.7	16	0.3	0.7	2	0.7	1.6	4	0	0	0	0	0	0	0	0	0	11.1	25.5	71	0	0	0	15.3	33.5
2c* 18.1 miles	5.9	9.4	42	0	0	0	0.1	0.1	0	0	0	0	0	0	0	0	0	0	4.6	8.0	35	0	0	0	10.6	17.5
2d* 7.0 miles	0.7	1.4	9	0	0	0	0.7	1.1	7	0	0	0	0	0	0	0	0	0	5.6	12.7	83	0	0	0	7.0	15.2
3a* 0.1 mile	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.1	100	0	0	0	0.1	0.1
3b 21.7 miles	0.5	0.5	1	0	0	0	0.7	0.8	2	0.5	0.4	1	0.2	0.4	1	0.1	0.1	0	5.4	6.9	20	1.7	1.2	4	9.1	10.5

	VEGETATION TYPE (LINEAR MILES CROSSED, ACRES DISTURBED, AND % OF VEGETATION TYPE DISTURBED BY TOTAL ROUTE SEGMENT)[1]																								TOTAL LONG-TERM DISTURBANCE[2]	
ROUTE SEGMENT	ANNUAL GRASSLAND			INTERMITTENT STREAM/GULLY			PERENNIAL GRASSLAND			RABBITBRUSH/ ANNUAL GRASSLAND			RIPARIAN			SAGEBRUSH/ ANNUAL GRASSLAND			SAGEBRUSH/ PERENNIAL GRASSLAND			TREES (ASPEN & POPLAR)			TOTAL MILES OF VEGETATION DISTURBED	TOTAL ACRES OF VEGETATION DISTURBED
	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac
3c* 25.4 miles	3	3.8	15	0	0	0	0	0	0	2.1	2.4	9	0.3	0.3	1	0.6	0.6	2	9.8	11.9	45	0	0	0	15.8	19.0

Notes: [1]Miles crossed (mi) = inventory measurement; Acres (ac) = amount of long-term disturbance; % = percent of vegetation type disturbed compared to the total amount of disturbance for the Route (including agriculture, cliff/rock, disturbed or developed, and water which are not shown). [2]Total long-term disturbance to vegetation does not include disturbance to agriculture, rock/cliff, disturbed or developed and water. Acres of short-term disturbance are presented in the discussion section for each route segment.
*Route segments that comprise the Agency Preferred Alternative.

TABLE 4.2-5 LONG-TERM DISTURBANCE TO SPECIAL STATUS SPECIES AND HABITAT BY ROUTE SEGMENT

ROUTE SEGMENT	HABITAT SUITABILITY (LINEAR MILES CROSSED, ACRES DISTURBED, AND % OF HABITAT DISTURBED BY TOTAL ROUTE SEGMENT)[1]									SPECIAL STATUS PLANTS AND COMMUNITIES		
	SUITABLE			MARGINAL			UNSUITABLE			WNHP SPECIAL STATUS PLANT POLYGONS CROSSED	SPECIAL STATUS PLANTS FOUND DURING SURVEY	WNHP PRIORITY PLANT COMMUNITIES CROSSED
	mi	ac	%	mi	ac	%	mi	ac	%	mi	mi	mi
1a* 2.2 miles	0.5	0.4	25	1.1	0.8	50	0.6	0.4	25	0	0	0
1b* 12.5 miles	6.3	5.1	46	5.1	5.3	48	1.1	0.7	6	0	0.4	0
1c 12.9 miles	3.2	6.0	26	8.5	16.0	70	1.2	0.8	4	0	0	0
2a* 1.0 mile	0	0	0	1.0	2.1	100	0	0	0	0	0	0
2b 16.4 miles	11.4	26.1	73	3.9	7.3	20	1.1	2.3	6	0.5	0.5	0
2c* 18.1 miles	4.6	8.0	36	6.0	9.4	42	7.5	5.0	22	0	0	0
2d* 7.0 miles	5.6	12.6	83	1.4	2.6	17	0	0	0	2.1	0.6	0
3a* 0.1 mile	0.1	0.1	100	0	0	0	0	0	0	0	0	0
3b 21.7 miles	7.4	9.0	26	1.8	1.8	5	12.5	23.5	69	7.3	1.2	0
3c* 25.4 miles	10.5	12.8	49	5.7	6.8	26	9.2	6.7	25	5.4	0	2.9

Notes: [1]Miles crossed (mi) = inventory measurement; Acres (ac) = amount of long-term disturbance; % = percent of vegetation type disturbed compared to the total amount of disturbance for the Route. [2]Total long-term disturbance to vegetation does not include disturbance to agriculture, rock/cliff, disturbed or developed and water. Acres of short-term disturbance are presented in the discussion section for each route segment
*Route segments that comprise the Agency Preferred Alternative.

4.2.4.5 Route Segment 2b

General Vegetation

Construction of Route Segment 2b would result in long-term disturbance to approximately 33.5 acres of land (Table 4.2-4). The majority of disturbance, 25.5 acres, would occur in areas classified as sagebrush/perennial grassland. Long-term disturbance would also occur to annual (5.7 acres) and perennial (1.6 acres) grasslands, and a small amount (0.7 acre) of intermittent stream/gully. Impacts and project design features designed to reduce impacts are similar to those described for Route Segment 1a. Impact levels for Route Segment 2b would include 1.1 miles of no identifiable, 4.2 miles of low and 11.1 miles of moderate impacts. Approximately 55.6 acres of vegetation would be disturbed on a short-term basis.

Special Status Species and Priority Habitats

No federally-listed plant species were identified along Route Segment 2b. No WNHP priority ecosystems are known to occur along Route Segment 2b. Eighty-five percent (43 acres) of federal lands within this route segment were surveyed for special status plants; however, the majority of Route Segment 2b is comprised of non-federal land (266.9 acres) and was not surveyed (Table 3.2-3). As not all land within the route segment corridors was surveyed, impacts could occur to special status plant species. Long-term disturbance would occur to potential habitat for special status plants and include 26.1 acres of suitable, 7.3 acres of marginal and 2.3 acres unsuitable habitat. Project design features described above for Route Segment 1a would also be implemented during construction and maintenance of Route Segment 2b to minimize impacts to special status plants. With the implementation of project design features, impacts to special status plant species, potential suitable habitat, and WNHP priority ecosystems is anticipated to include 1.1 miles of no identifiable impacts (e.g., developed and agricultural land), 3.5 miles of low impacts and 11.8 miles of moderate impacts.

Columbia Milkvetch

Columbia milkvetch is a federal Species of Concern, BLM Sensitive and Washington Sensitive species (ISSSSP 2011). Columbia milkvetch is restricted to an area approximately 25 miles by 5.0 miles along the west side of the Columbia River in Yakima, Kittitas and Benton counties. In the region, nineteen populations are known to occur on approximately 34,579 acres. This species was identified along a 0.5 mile section of Route Segment 2b (Table 4.2-5). This occurrence was near a previously documented WNHP population and consisted of approximately 116 individuals scattered throughout 1.9 acres. As all potential habitat was not surveyed, additional Columbia milkvetch occurrences could be present. Primary threats to this species are the continued degradation of habitat by military training activities and livestock grazing, increase competition by exotic invasive species, and loss of habitat by orchard development (WNHP and BLM 2005). For the proposed Project, direct impacts to Columbia milkvetch are similar to those described for Nuttall's sandwort. Direct impacts to Columbia milkvetch could occur due to habitat loss from ground disturbance, injury and/or mortality from vehicle and human trampling during construction and maintenance, and increased OHV activity. Indirect impacts could occur through the degradation in habitat quality through the establishment of noxious weeds and invasive plants (e.g., cheatgrass) and increased wildland fire. In addition to project design features described above, the following project design features would be also be implemented to reduce direct and indirect impacts to Columbia milkvetch from the proposed Project: maintain intact vegetation wherever possible; minimize the blading of native plant communities during construction, consistent with safe construction practices; utilize overland travel where feasible; reseed disturbed areas using an Agency approved mixture of native and non-native species or seed for revegetation as detailed in POD; and develop and incorporate a Noxious Weed and Invasive Plant Management Plan and a Fire Protection and Control Plan into the final POD. Approximately 0.9 acre of disturbance is anticipated to occur in this location, less than 0.1 percent of the known occupied habitat for Columbia milkvetch in the region. However, it was assumed that this occurrence will be spanned and construction activities would avoid this occurrence. With the implementation of project design features described above and the assumption that this occurrence will be spanned and avoided, Project construction, operation and maintenance activities could cause some change or stress to the occurrence of Columbia milkvetch (moderate impact) but will not contribute a trend toward federal listing.

4.2.4.6 Route Segment 2c (Agency Preferred Alternative)

General Vegetation

Long-term disturbance would occur to approximately 17.5 acres of land through the construction in Route Segment 2c (Table 4.2-4). The majority of the disturbance would occur in areas classified as annual grasslands (9.4 acres) and sagebrush/perennial grasslands (8.0 acres). A small amount of perennial grassland (0.1 acre) would also be disturbed on a long-term basis. Impacts and project design features designed to reduce impacts are similar to those described for Route Segment 1a. Route Segment 2c impacts would include 7.5 miles of no identifiable, 6.0 miles of low and 4.6 miles of moderate impact levels. Short-term disturbance would occur to approximately 38.8 acres of vegetation.

Special Status Species and Priority Habitats

No special status plant species or priority ecosystems are known to occur along Route Segment 2c (Table 4.2-5). Fifty percent (0.1 acre) of federal lands within this route segment were surveyed for special status plants; however, the majority of Route Segment 2c is comprised of non-federal land (351.5 acres) and was not surveyed (Table 3.2-3). As not all land within the route segment corridors was surveyed, impacts could occur to special status plant species. Long-term disturbance would occur to potential habitat for special status plants and include eight acres of suitable, 9.4 acres of marginal and 5.0 acres unsuitable habitat. Project design features described above for Route Segment 1a would also be implemented during construction and maintenance of Route Segment 2c to minimize impacts to special status plants. With the implementation of project design features, impacts to special status plant species, potential suitable habitat, and WNHP priority ecosystems is anticipated to include 7.5 miles of no identifiable impacts (e.g., developed and agricultural land), 6.0 miles of low impacts and 4.6 miles of moderate impacts.

Columbia Milkvetch

Columbia milkvetch is a federal Species of Concern, BLM Sensitive and Washington Sensitive species (ISSSSP 2011). Columbia milkvetch is restricted to an area approximately 25 miles by 5 miles along the west side of the Columbia River in Yakima, Kittitas and Benton counties. In the region, nineteen populations are known to occur on approximately 34,579 acres. WNHP data indicates that Columbia milkvetch is known to occur within one mile of Route Segment 2c. As all potential habitat was not surveyed, additional Columbia milkvetch occurrences could be present. Primary threats to this species are the continued degradation of habitat by military training activities and livestock grazing, increase competition by exotic invasive species, and loss of habitat by orchard development (WNHP and BLM 2005). For the proposed Project, direct impacts to Columbia milkvetch are similar to those described for Nuttall’s sandwort. Direct impacts to Columbia milkvetch could occur due to habitat loss from ground disturbance, injury and/or mortality from vehicle and human trampling during construction and maintenance, and increased off-highway vehicle (OHV) activity. Indirect impacts could occur through the degradation in habitat quality through the establishment of noxious weeds and invasive plants (e.g., cheatgrass) and increased wildland fire. In addition to project design features described above, the following project design features would be also be implemented to reduce direct and indirect impacts to Columbia milkvetch from the proposed Project: maintain intact vegetation wherever possible; minimize the blading of native plant communities during construction, consistent with safe construction practices; utilize overland travel where feasible; reseed disturbed areas using an Agency approved mixture of native and non-native species or seed for revegetation as detailed in POD; and develop and incorporate a

Noxious Weed and Invasive Plant Management Plan and a Fire Protection and Control Plan into the final POD. Approximately 0.9 acre of disturbance is anticipated to occur in this location; however it was assumed that this occurrence will be spanned and construction activities would avoid this occurrence. With the implementation of project design features described above and the assumption that this occurrence will be spanned and avoided, Project construction, operation and maintenance activities could cause some change or stress to the occurrence of Columbia milkvetch (moderate impact) but will not contribute a trend toward federal listing.

4.2.4.7 Route Segment 2d (Agency Preferred Alternative)

General Vegetation

Long-term disturbance to approximately 15.2 acres of land would occur through the construction of Route Segment 2d (Table 4.2-4). The majority of disturbance, 12.7 acres, would occur in areas classified as sagebrush/perennial grassland. Annual and perennial grasslands (1.4 and 1.1 acres respectively) would also be disturbed on a long-term basis. Impacts and project design features designed to reduce impacts are similar to those described for Route Segment 1a. Impact levels for Route Segment 2d would include 1.9 miles of low and 5.2 miles of moderate impacts. Short-term disturbance would occur to approximately 26.4 acres of vegetation.

Special Status Species and Priority Habitats

No federally-listed plant species are known to occur along Route Segment 2d (Table 4.2-4). No WNHP priority ecosystems are known to occur along Route Segment 2d. One hundred percent (19.7 acres) of federal lands within this route segment were surveyed for special status plants; however, the majority of Route Segment 2d is comprised of non-federal land (117.3 acres) and was not surveyed (Table 3.2-3). As not all land within the route segment corridors was surveyed, impacts could occur to special status plant species. Long-term disturbance would occur to potential habitat for special status plants and include 12.6 acres of suitable and 2.6 acres of marginal habitat. Project design features described above for Route Segment 1a would also be implemented during construction and maintenance of Route Segment 2d to minimize impacts to special status plants. With the implementation of project design features, impacts to special status plant species, potential suitable habitat, and WNHP priority ecosystems is anticipated to include 0.2 mile of low impacts and 6.8 miles of moderate impacts.

Columbia Milkvetch

Columbia milkvetch, a special status plant species, was documented along a 0.6 mile section of Route Segment 2d and WNHP data indicates that this species may occur along an additional 1.3 mile section. These locations include large buffers, so it is difficult to accurately determine whether these occurrences truly intersect the ROW corridor. Direct impacts and project design features that would be implemented to minimize impacts to occurrences Columbia milkvetch are similar to those described above for Route Segment 2c. With the implementation of project design features described above and the assumption that occurrences would be spanned and avoided, Project construction, operation and maintenance activities could cause some change or stress to the Columbia milkvetch (moderate impact) but will not contribute a trend toward federal listing.

Awned Halfchaff Sedge

Awned Halfchaff Sedge is a BLM Sensitive and Washington Threatened species. This species is found from California north to Washington and west to Idaho, Wyoming, Utah, Arizona, Colorado, New Mexico, Kansas, Oklahoma, Texas, Minnesota, Iowa, Missouri, and Indiana. In Washington, awned halfchaff sedge is known from two recent occurrences occupying approximately 2,717 acres along the Columbia River in Benton, Grant, and Franklin counties and five historical occurrences from Klickitat, Whitman, Benton, and Asotin counties. WNHP data indicates that awned halfchaff sedge intersects Route Segment 2d. These locations include large buffers, so it is difficult to accurately determine whether these occurrences truly intersect the ROW corridor. The primary threat to this species is loss of habitat due to hydrologic change. The known occurrences of awned halfchaff sedge are within wetlands along the Columbia River. With the proposed Project, wetlands and the area immediately adjacent to the Columbia River would be avoided. With the implementation of project design features described above and the assumption that occurrences would be spanned and avoided, Project construction, operation and maintenance activities could cause some change or stress to the awned halfchaff sedge (moderate impact) but will not contribute a trend toward federal listing.

4.2.4.8 Route Segment 3a (Agency Preferred Alternative)

General Vegetation

Long-term disturbance to approximately 0.1 acre of land would occur with the construction of Route Segment 3a. Disturbance along this short segment would in sagebrush/perennial grasslands (0.1 acre; Table 4.2-4). The impact level for Route Segment 3a is moderate (0.1 mile). Just over one acre of vegetation would be disturbed on a short-term basis.

Special Status Species and Priority Habitats

No special status plant species or priority ecosystems are known to occur along Route Segment 3a (Table 4.2-5). The entirety of this route segment is comprised of non-federal land (3.3 acres) and was not surveyed (Table 3.2-3). As land within the route segment corridors was not surveyed, impacts could occur to special status plant species. Long-term disturbance would occur to 0.1 acre potential suitable habitat for special status plants. Project design features described above for Route Segment 1a would also be implemented during construction and maintenance of Route Segment 3a to minimize impacts to special status plants. With the implementation of project design features, impacts to special status plant species, potential suitable habitat, and WNHP priority ecosystems is anticipated to be 0.1 mile of low impacts.

4.2.4.9 Route Segment 3b

General Vegetation

Construction of Route Segment 3b would disturb approximately 10.5 acres of land over a long-term basis (Table 4.2-4). Over half of the disturbance would occur in areas classified as sagebrush/perennial grassland (6.9 acres). The remaining disturbance would occur in annual (0.5 acre) and perennial (0.8 acre) grasslands, rabbitbrush/annual grassland (0.4 acre), sagebrush/annual grassland (0.1 acre) riparian (0.4 acre), and tree (1.4 acres) cover types. Impact levels include 12.3 miles of no identifiable, 2.1 miles of low, 7.3 miles of moderate impacts. Short-term disturbance to approximately 31.4 acres of vegetation would occur through construction of Route Segment 3b.

Special Status Species and Priority Habitats

No federally-listed plant species were identified along Route Segment 3b (Table 4.2-5). Three special status plant species occur along sections this route segment: Nuttall's sandwort (0.1 mile), Columbia milkvetch (1.2 mile), and caespitose evening primrose (0.4 mile). WNHP data indicates that these species may occur along an additional 4.8 miles of the route segment. WNHP data on special status plant occurrences indicates that Route Segment 3b intersects 3.8 miles of Hoover's desert parsley, 1.8 miles of gray cryptantha, 0.7 mile of beaked spike-rush, and 0.3 mile of Kalm's lobelia. These locations include large buffers, so it is difficult to accurately determine whether these occurrences truly intersect the ROW corridor. No WNHP priority ecosystems are known to occur along Route Segment 3b. Thirty-six percent (61.1 acres) of federal lands within this route segment were surveyed for special status plants; however, the majority of Route Segment 3b is comprised of non-federal land (250.6 acres) and was not surveyed

(Table 3.2-3). As not all land within the route segment corridors was surveyed, impacts could occur to special status plant species. Long-term disturbance would occur to potential habitat for special status plants and include 9.0 acres of suitable, 1.8 acres of marginal and 23.5 acres of unsuitable habitat. Project design features described above for Route Segment 1a would also be implemented during construction and maintenance of Route Segment 3a to minimize impacts to special status plants. With the implementation of project design features, impacts to special status plant species, potential suitable habitat, and WNHP priority ecosystems is anticipated to include 7.5 miles of no identifiable impacts (e.g., developed and agricultural land), 5.9 miles of low impacts and 8.3 miles of moderate impacts.

Nuttall's Sandwort

Nuttall's sandwort, a special status plant species, was documented along a 0.1 mile section of Route Segment 3b. The occurrence consisted of one individual and was located near previously documented populations. These locations include large buffers, so it is difficult to accurately determine whether these occurrences truly intersect the ROW corridor. Direct impacts and project design features that would be implemented to minimize impacts to occurrences Nuttall's sandwort are similar to those described above for Route Segment 1b. Approximately 0.1 acre of permanent disturbance is anticipated to occur in this location, less than 0.1 percent of the known occupied habitat for Nuttall's sandwort in the region. However it was assumed that this occurrence will be spanned and construction activities would avoid this occurrence. With the implementation of project design features described above and the assumption that occurrences would be spanned and avoided, Project construction, operation and maintenance activities could cause some change or stress to the Nuttall's sandwort (moderate impact) but will not contribute a trend toward federal listing.

Columbia Milkvetch

Columbia milkvetch, a special status plant species, was documented along a 1.2 mile section of Route Segment 3b. The occurrence of Columbia milkvetch contained approximately 158 individuals within 5.4 acres and was located near previously documented populations. These locations include large buffers, so it is difficult to accurately determine whether these occurrences truly intersect the ROW corridor. Direct impacts and project design features that would be implemented to minimize impacts to occurrences Columbia milkvetch are similar to those described above for Route Segment 2c. Approximately 0.8 acre of permanent disturbance is anticipated to occur in this location, less than 0.1 percent of the known occupied habitat for Columbia milkvetch in the region. However, it was assumed that these occurrences will be spanned and construction activities would avoid occurrences. With the implementation of project design features described above and the assumption that occurrences would be spanned and avoided, Project construction, operation and maintenance activities could cause some change or stress to the Columbia milkvetch (moderate impact) but will not contribute a trend toward federal listing.

Caespitose Evening-Primrose

Caespitose evening-primrose is a BLM Sensitive and Washington Sensitive species. This species is known from eastern Oregon eastward, through Montana and Wyoming to the Dakotas. In Washington it occurs in Kittitas, Yakima, Grant and Benton Counties. Within the region, nine populations occupying approximately 1,737 acres are known to occur. This species was identified along a 0.4 mile section of Route Segment 3b (Table 4.2-5). The occurrence of caespitose evening primrose was located within a previously documented location and consisted of approximately 75 individuals scattered throughout 0.14 acre within and along the ROW. As not all potential habitat was surveyed, additional caespitose evening-primrose occurrences could be present. Primary threats to this species include habitat disturbance by grazing, road construction and maintenance, land conversion and mineral extraction (WNHP and BLM 2005). For the proposed Project, direct impacts to caespitose evening-primrose are similar to those described for Nuttall's sandwort. Direct impacts to this species could occur due to habitat loss from ground disturbance, injury and/or mortality from vehicle and human trampling during construction and maintenance, and increased OHV activity. Indirect impacts could occur through the degradation in habitat quality through the establishment of noxious weeds and invasive plants (e.g., cheatgrass) and increased wildland fire. In addition to project design features described above, the following project design features would be also be implemented to reduce direct and indirect impacts to caespitose evening-primrose from the proposed Project: maintain intact vegetation wherever possible; minimize the blading of native plant communities during construction, consistent with safe construction practices; utilize overland travel where feasible; reseed disturbed areas using an Agency approved mixture of native and non-native species or seed for revegetation as detailed in POD; and develop and incorporate a Noxious Weed and Invasive Plant Management Plan and a Fire Protection and Control Plan into the final POD. Approximately 0.4 acre of disturbance is anticipated to occur in this location, less than 0.1 percent of known occupied habitat for caespitose evening-primrose in the region. However, it was assumed that this occurrence will be spanned and construction activities would avoid this occurrence. With the implementation of project design features described above and the assumption that this occurrence will be spanned and avoided, Project construction, operation and maintenance activities could cause some change or stress to the occurrence of caespitose evening-primrose (moderate impact) but will not contribute a trend toward federal listing.

Hoover's Desert Parsley

Hoover's desert parsley is a federal Species of Concern, BLM Sensitive, and Washington Sensitive species. This species is endemic to Washington and is known only from Yakima County and adjacent portions of Benton, Grant, and Kittitas counties. Within the region, Hoover's desert parsley is known from 22 populations occupying approximately 13,210 acres. WNHP data indicates that Hoover's desert parsley intersects Route Segment 3b. These locations include large buffers, so it is difficult to accurately determine whether these occurrences truly intersect the ROW corridor. The primary threats to this species include gravel extraction, road construction, military training activities, grazing herbicide drift from nearby agricultural land and noxious weed establishment (WNHP and BLM 2005). Impacts from the proposed Project are similar to those described above for Nuttall's sandwort. With the implementation of project design features described above and the assumption that potential occurrences would be spanned and avoided, Project construction, operation and maintenance activities could cause some change or stress to Hoover's desert parsley (moderate impact) but will not contribute a trend toward federal listing.

Gray Cryptantha

Gray cryptantha is a federal Species of Concern, BLM Sensitive, and Washington Sensitive species. This species is a regional endemic in the Columbia and Lower Yakima Rivers in the Western Columbia Basin. It occurs from Wenatchee, Washington to The Dalles, Oregon. In Washington, it is currently known from Benton, Franklin, Grant, Kittitas, Walla Walla, and Yakima counties and historically Douglas County. Within the region, gray cryptantha is known from 33 populations occupying approximately 16,169 acres. WNHP data indicates that gray cryptantha intersects Route Segment 3b. These locations include large buffers, so it is difficult to accurately determine whether these occurrences truly intersect the ROW corridor. The primary threats to this species include OHV use, increased weed invasions, changes in sand deposition and agricultural conversion (WNHP and BLM 2005). Impacts from the proposed Project are similar to those described above for Nuttall's sandwort. With the implementation of project design features described above and the assumption that potential occurrences would be spanned and avoided, Project construction, operation and maintenance activities could cause some change or stress to gray cryptantha (moderate impact) but will not contribute a trend toward federal listing.

Beaked Spike-Rush

Beaked spike-rush is a Washington Sensitive species. Beaked spike-rush is known from Vancouver Island to Nova Scotia, Canada south to northern Mexico and the greater Antilles, and in the South American Andes. In Washington, beaked spike-rush is currently known from Grant and Yakima counties. Within the region, beaked spike-rush is known from six populations occupying approximately 563 acres. WNHP data indicates that a beaked spike-rush occurrence intersects Route Segment 3b. Beaked spike-rush has been documented along the Columbia River near Alkali Canyon Creek and Borden Springs. The primary threats to this species are the invasion of habitat by exotic species and loss of habitat through the increased density of woody species (WNHP and BLM 2005). Impacts from the proposed Project are similar to those described above for Nuttall's sandwort. With the implementation of project design features described above and the assumption that potential occurrences would be spanned and avoided, Project construction, operation and maintenance activities could cause some change or stress to beaked spike-rush (moderate impact) but will not contribute a trend toward federal listing.

Kalm's Lobelia

Kalm's lobelia is a Washington Endangered species. Kalm's lobelia occurs from Newfoundland to Pennsylvania, west to British Columbia, and Colorado to Hudson Bay and the southern Mackenzie District. In Washington, it occurs in Yakima County. Within the region, Kalm's lobelia is known from one population occupying approximately 92 acres. WNHP data indicates that a Kalm's lobelia occurrence intersects Route Segment 3b. Kalm's lobelia has been documented along the Columbia River near Alkali Canyon Creek and Borden Springs. The primary threats to this species include habitat degradation from livestock, weedy species and altering the flow of the natural spring (WNHP and BLM 2005). Impacts from the proposed Project are similar to those described above for Nuttall's sandwort. With the implementation of project design features described above and the assumption that potential occurrences would be spanned and avoided, Project construction, operation and maintenance activities could cause some change or stress to Kalm's lobelia (moderate impact) but will not contribute a trend toward federal listing.

4.2.4.10 Route Segment 3c (Agency Preferred Alternative)

General Vegetation

Construction of Route Segment 3c would result in the long-term disturbance to approximately 19 acres of land (Table 4.2-4). Over half of the disturbance (11.9 acres) would occur in areas classified as sagebrush/perennial grassland. The remaining disturbance would occur in areas classified as annual grassland (3.8 acres), rabbitbrush/annual grassland (2.4 acres), riparian (0.3 acre), and sagebrush/annual grassland (0.6 acre). Impact levels include 9.1 miles of no identifiable, 6.5 miles of low, and 9.8 miles of moderate impacts. Construction of Route Segment 3c would result in short-term disturbance to approximately 59.4 acres of vegetation.

No federally-listed plant species are known to occur along Route Segment 3c. WNHP data indicates that Route Segment 3c intersects one WNHP Priority Ecosystem, Intermountain Basins Active and Stabilized Dune. Approximately 2.7 miles of the Route Segment 3c crosses this plant community just north of the Columbia River. The second occurrence, 0.2 mile, is located in the Saddle Mountains. Impacts to this plant community would occur through disturbance and vegetation removal associated construction. Impacts would be reduced by: closing access roads, where not needed; implementing noxious weed control, and minimizing blading and disturbance to plant communities.

Special Status Species and Priority Habitats

WNHP data on special status plant occurrences indicates that Route Segment 3c intersects 0.1 mile of awned halfchaff sedge, 0.8 mile of Columbia milkvetch, 3.0 miles of gray cryptantha, and 1.5 miles of Hoover's desert-parsley. These locations include large buffers, so it is difficult to accurately determine whether these occurrences truly intersect the ROW corridor. Ninety-nine percent (179.8 acres) of federal lands within this route segment were surveyed for special status plants; however, the majority of Route Segment 3c is comprised of non-federal land (308.7 acres) and was not surveyed (Table 3.2-3). As not all land within the route segment corridors was surveyed, impacts could occur to special status plant species. Long-term disturbance would occur to potential habitat for special status plants and include 12.8 acres of suitable, 6.8 acres of marginal and 6.7 acres unsuitable habitat. Project design features described above for Route Segment 1a would also be implemented during construction and maintenance of Route Segment 3c to minimize impacts to special status plants. With the implementation of project design features, impacts to special status plant species, potential suitable habitat, and WNHP priority ecosystems is anticipated to include 8.4 miles of no identifiable impacts (e.g., developed and agricultural land), 3.7 miles of low impacts and 13.3 miles of moderate impacts.

Awned Halfchaff Sedge

WNHP data indicates that awned halfchaff sedge, a special status species, intersects Route Segment 3c. These locations include large buffers, so it is difficult to accurately determine whether these occurrences truly intersect the ROW corridor. The primary threat to this species is loss of habitat due to hydrologic change. Known occurrences of awned halfchaff sedge are within wetlands along the Columbia River. With the proposed Project, wetlands and the area immediately adjacent to the Columbia River would be avoided. With the implementation of project design features described above and the assumption that occurrences would be spanned and avoided, Project construction, operation and maintenance activities could cause some change or stress to the awned halfchaff sedge (moderate impact) but will not contribute a trend toward federal listing.

Columbia Milkvetch

WHHP data indicates that Columbia milkvetch, a special status plant species, may occur along this route segment. These locations include large buffers, so it is difficult to accurately determine whether these occurrences truly intersect the ROW corridor. Direct impacts and project design features that would be implemented to minimize impacts to potential occurrences Columbia milkvetch are similar to those described above for Route Segment 2c. With the implementation of project design features described above and the assumption that occurrences would be spanned and avoided, Project construction, operation and maintenance activities could cause some change or stress to the Columbia milkvetch (moderate impact) but will not contribute a trend toward federal listing.

Gray Cryptantha

WHHP data indicates that gray cryptantha, a special status species, intersects Route Segment 3c. These locations include large buffers, so it is difficult to accurately determine whether these occurrences truly intersect the ROW corridor. The primary threats to this species include OHV use, increased weed invasions, changes in sand deposition and agricultural conversion (WNHP and BLM 2005). Impacts from the proposed Project are similar to those described above for Nuttall's sandwort. With the implementation of project design features described above and the assumption that potential occurrences would be spanned and avoided, Project construction, operation and maintenance activities could cause some change or stress to gray cryptantha (moderate impact) but will not contribute a trend toward federal listing.

Hoover's Desert Parsley

WNHP data indicates that Hoover's desert parsley, a special status species, may intersect Route Segment 3c. These locations include large buffers, so it is difficult to accurately determine whether these occurrences truly intersect the ROW corridor. The primary threats to this species include gravel extraction, road construction, military training activities, grazing herbicide drift from nearby agricultural land and noxious weed establishment (WNHP and BLM 2005). Impacts from the proposed Project are similar to those described above for Nuttall's sandwort. With the implementation of project design features described above and the assumption that potential occurrences would be spanned and avoided, Project construction, operation and maintenance activities could cause some change or stress to Hoover's desert parsley (moderate impact) but will not contribute a trend toward federal listing.

4.2.5 Mitigation Measures

The project design features and environmental protection measures described in Section 2.5 (Project Design Features Common to Action Alternatives) have been incorporated into the project design and would be implemented during construction and operation of the proposed Project. These measures are designed to avoid or minimize environmental impacts from Project construction, operation and maintenance activities and are items that Pacific Power has committed to implement as part of the Project development; therefore, no additional mitigation would be required.

4.2.6 Impact Summary By Alternative

4.2.6.1 No Action

Under the No Action Alternative, the proposed Project would not be constructed or operated. No Project-related impacts to vegetation would occur, but changes in vegetation would continue as a result of natural conditions and future development.

4.2.6.2 Route Alternatives

Table 4.2-6 presents a summary of the impacts for each of the end-to-end alternatives and impact levels following the implementation of project design features for vegetation resources. The impact summary for special status plants and priority ecosystems is presented separately in Table 4.2-7.

Long-term disturbance to vegetation ranges from just over 56 acres (Alternative C) to almost 94 acres (Alternative F; Table 4.2-6). Construction of Alternative C would disturb the smallest amount of vegetation (56.3 acres) and disturbs the fewest miles of vegetation, with 41.2 miles disturbed. The greatest amount of disturbance to vegetation would occur through the construction of Alternative F (93.7 acres and 53.5 miles). Miles with no identifiable impacts range from 11.4 miles (Alternative F) to 21.6 miles (Alternative C). Miles of low impacts range from 15.4 miles (Alternative B) to 25.5 miles (Alternative H). Alternative G has the fewest miles of moderate impact (20.8), while Alternative A has the most miles of moderate impact (32.8 miles).

Alternatives D (Agency Preferred Alternative) and H would cross the fewest miles of WNHP special status plant polygons (7.5 miles each), while Alternatives B and E would cross the greatest number of miles of these polygons (9.9 miles each). Alternative H crosses the fewest miles (0.6 mile) and Alternative B crosses the most miles (2.7 miles) with special status plants found during the survey. One WNHP priority ecosystem is crossed by Alternatives A, D, F, and H (2.9 miles each).

TABLE 4.2-6 LONG-TERM DISTURBANCE TO VEGETATION AND IMPACT SUMMARY OF END-TO-END ALTERNATIVES

END-TO-END ALTERNATIVES	VEGETATION TYPE (LINEAR MILES CROSSED, ACRES DISTURBED, AND % OF VEGETATION TYPE DISTURBED BY ALTERNATIVE)[1]																								TOTAL LONG-TERM DISTURBANCE[2]		IMPACTS (MILES)[3]			
	ANNUAL GRASSLAND			INTERMITTENT STREAM/GULLY			PERENNIAL GRASSLAND			RABBITBRUSH/ ANNUAL GRASSLAND			RIPARIAN			SAGEBRUSH/ANNUAL GRASSLAND			SAGEBRUSH/PERENNIAL GRASSLAND			TREES (ASPEN & POPLAR)			TOTAL MILES OF VEGETATION DISTURBED	TOTAL ACRES OF VEGETATION DISTURBED	HIGH	MODERATE	LOW	NO IDENTIFIABLE
	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	mi	mi	mi	mi
Alt. A 1a, 1b, 2a, 2b, 2d, 3a, 3c 64.5 miles	10.8	15.5	17	0.3	0.7	1	4.3	6.0	6	2.6	3.0	3	0.3	0.3	0	0.6	0.6	1	33.4	55.8	60	0.1	0.1	0	52.6	82.0	0	32.8	19.8	11.9
Alt. B 1a, 1b, 2a, 2b, 2d, 3a, 3b 61.0 miles	8.3	12.1	12	0.3	0.7	1	5.0	6.7	7	1.0	0.9	1	0.2	0.4	0	0.1	0.1	0	29.0	50.0	51	1.8	1.3	2	45.9	72.2	0	30.5	15.4	15.1
Alt. C 1a, 1b, 2a, 2c, 2d, 3a, 3b 62.8 miles	11.0	15.8	18	0	0	0	4.4	5.2	6	1.0	0.9	1	0.2	0.4	0	0.1	0.1	0	22.5	32.6	38	1.8	1.3	2	41.2	56.3	0	24.0	17.2	21.6
Alt. D (Agency Preferred Alt.) 1a, 1b, 2a, 2c, 2d, 3a, 3c 66.3 miles	13.5	19.2	24	0	0	0	3.7	4.5	6	2.6	3.0	4	0.3	0.3	0	0.6	0.6	1	26.9	38.4	48	0.1	0.1	0	48.1	66.1	0	26.5	21.6	18.2
Alt. E 1a, 1c, 2a, 2b, 2d, 3a, 3b 61.4 miles	13.8	24.0	21	0.4	0.8	0	3.2	5.6	5	0.8	0.9	1	0.2	0.4	0	0.1	0.1	0	25.8	50.9	46	1.7	1.2	1	46.6	83.9	0	27.3	19.3	14.8
Alt. F 1a, 1c, 2a, 2b, 2d, 3a, 3c 64.9 miles	16.3	27.4	26	0.4	0.8	0	2.5	4.9	5	2.4	3.0	3	0.3	0.3	0	0.6	0.6	1	30.2	56.7	54	0	0	1	53.5	93.7	0	29.8	23.7	11.4
Alt. G 1a, 1c, 2a, 2c, 2d, 3a, 3b 63.2 miles	16.5	27.7	28	0.1	0.1	0	2.6	4.1	4	0.8	0.9	1	0.2	0.4	0	0.1	0.1	0	19.3	33.4	34	1.7	1.2	1	41.9	67.9	0	20.8	21.1	21.3
Alt. H 1a, 1c, 2a, 2c, 2d, 3a, 3c 66.7 miles	19.0	31.1	34	0.1	0.1	0	1.9	3.4	4	2.4	3.0	3	0.3	0.3	0	0.6	0.6	1	23.7	39.2	43	0	0	0	48.8	77.0	0	23.3	25.5	17.9

Notes: [1]Miles crossed (mi) = inventory measurement; Acres (ac) = amount of long-term disturbance; % = percent of vegetation type disturbed compared to the total amount of disturbance for each Alternative (including agriculture, cliff/rock, disturbed or developed, and water which are not shown). [2]Total miles of vegetation disturbance does not include disturbance to agriculture, cliff/rock, disturbed or developed and water. [3]Impact levels in linear miles. Areas with no identifiable impacts include areas where no roads would be necessary, steep areas that would be spanned and disturbance to agriculture, disturbed or developed areas and water. PDFs described in Chapter 2 are designed to reduce effects from the proposed Project; therefore, no additional mitigation would be required.

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TABLE 4.2-7 LONG TERM DISTURBANCE TO SPECIAL STATUS PLANT SPECIES AND HABITAT, AND IMPACT SUMMARY OF END-TO-END ALTERNATIVES

	SPECIAL STATUS PLANTS AND ECOSYSTEMS (MILES)			HABITAT SUITABILITY (MILES)[1]			IMPACTS (MILES)[2]			
END-TO-END ALTERNATIVES	WNHP SPECIAL STATUS PLANT POLYGONS CROSSED	SPECIAL STATUS PLANTS FOUND DURING SURVEY	WNHP PRIORITY ECOSYSTEMS CROSSED	SUITABLE	MARGINAL	UNSUITABLE	HIGH	MODERATE	LOW	NO IDENTIFIABLE
	mi	mi	mi	mi	mi	mi	mi	mi	mi	mi
Alternative A 1a, 1b, 2a, 2b, 2d, 3a, 3c 64.5 miles	8.0	1.5	2.9	34.3	18.2	12.0	0	38.8	15.1	10.6
Alternative B 1a, 1b, 2a, 2b, 2d, 3a, 3b 61.0 miles	9.9	2.7	0	31.4	14.3	15.3	0	33.9	17.3	9.8
Alternative C 1a, 1b, 2a, 2c, 2d, 3a, 3b 62.8 miles	9.4	2.2	0	24.6	16.4	21.8	0	26.7	19.8	16.3
Alternative D (Agency Preferred Alternative) 1a, 1b, 2a, 2c, 2d, 3a, 3c 66.3 miles	7.5	1.0	2.9	27.6	20.3	18.4	0	31.7	17.6	17.0
Alternative E 1a, 1c, 2a, 2b, 2d, 3a, 3b 61.4 miles	9.9	2.3	0	28.3	17.7	15.4	0	30.7	20.8	9.9
Alternative F 1a, 1c, 2a, 2b, 2d, 3a, 3c 64.9 miles	8.0	1.1	2.9	31.2	21.6	12.1	0	35.7	18.6	10.6

	SPECIAL STATUS PLANTS AND ECOSYSTEMS (MILES)			HABITAT SUITABILITY (MILES)[1]			IMPACTS (MILES)[2]			
END-TO-END ALTERNATIVES	WNHP SPECIAL STATUS PLANT POLYGONS CROSSED	SPECIAL STATUS PLANTS FOUND DURING SURVEY	WNHP PRIORITY ECOSYSTEMS CROSSED	SUITABLE	MARGINAL	UNSUITABLE	HIGH	MODERATE	LOW	NO IDENTIFIABLE
	mi	mi	mi	mi	mi	mi	mi	mi	mi	mi
Alternative G 1a, 1c, 2a, 2c, 2d, 3a, 3b 63.2 miles	9.4	1.8	0	21.5	19.8	21.9	0	23.5	23.3	16.4
Alternative H 1a, 1c, 2a, 2c, 2d, 3a, 3c 66.7 miles	7.5	0.6	2.9	24.5	23.7	18.5	0	28.5	21.1	17.1

[1]Unsuitable habitat included: agricultural land; developed, road, or firebreak; irrigation canal; open water; and watered poplar. Marginal habitat included: annual grassland, perennial grassland; rabbitbrush/annual grassland, and sagebrush annual grassland. Suitable habitat included: basalt cliff/rock, sagebrush/perennial grassland, aspen, intermittent stream or dry gully, and riparian.
[2]Impact levels in linear miles.

4.3 WILDLIFE AND SPECIAL STATUS WILDLIFE SPECIES

4.3.1 Methods and Impact Types

4.3.1.1 Analysis Methods

The impact analysis for wildlife and special status wildlife species identified in Section 3.3 focused on impacts resulting from actions that alter habitat. Three areas of focus for this analysis included biological change, habitat degradation, and disturbance. Alteration may occur through direct habitat loss via surface disturbance, direct mortality from construction activities, or indirectly through the reduction in habitat quality such as increased noise levels or the presence of anthropogenic structures. Both the direct and indirect impacts of transmission line development are associated with ground disturbance caused by constructing road networks for access, installation of transmission structures, conductors, and other infrastructure, and ongoing maintenance. Wildlife habitats were assembled from vegetation categories described in Sections 3.2 and 4.2 (Vegetation and Special Status Plants). Refer to Chapter 2 for a description of the disturbance model and to Section 4.2 for a discussion of the impacts specific to vegetation.

Impacts to wildlife and special status wildlife species are presented by route segment (Sections 4.3.3 Impacts Common to All Route Segments and 4.3.4 Impacts Specific to Route Segment) and then collectively by Alternative (Section 4.3.6). Route Segments 1a, 2a, 2d, and 3a do not have comparative segments and are common to all Alternatives.

4.3.1.2 Impact Criteria

Sensitivity classifications were assigned to wildlife resources that occur within the Project area. These sensitivity classifications served as the basis for assigning impact levels. The criteria used to assess the impacts to wildlife resources are summarized in Tables 4.3-1 and 4.3-2.

TABLE 4.3-1 WILDLIFE RESOURCE SENSITIVITY CLASSIFICATION

WILDLIFE RESOURCE	SENSITIVITY	POTENTIAL IMPACT FROM THE PROPOSED PROJECT
Bald Eagle Management Area	High	Disturb sensitive bald eagle populations and reduction in species habitat.
Bald eagle winter roost - within 1 mile	High	Disturb sensitive bald eagle habitat during a stressful period in the species lifecycle.
Greater sage-grouse lek – within 0 to 0.6 mile of the proposed transmission line	High	Disturb breeding grouse, lek abandonment, and reduction in breeding habitat.
Greater Sage-Grouse Regularly Occupied habitat	High	Reduction in quality habitat (abundance and quality) that supports sensitive obligate species and is slow to recover from disturbance.
Raptor nesting area - within 1 mile of the proposed transmission line	High	Disturb breeding raptors, nest abandonment, and reduction in breeding habitat.
Riparian, Perennial Streams/Marsh	High	Reduction in sensitive habitat that is fragile and slow to recover from disturbance.
Sagebrush/Perennial Grassland	High	Reduction in quality habitat that supports sensitive obligate species and is slow to recover from disturbance.
Special Status Wildlife Species Occurrences	High	Disturb fragile populations of species and reduction in species habitat.
Trees (Aspen and Poplar)	High	Reduction in quality habitat that supports sensitive obligate species and is slow to recover from disturbance.
Basalt cliffs	Moderate	Reduction in quality habitat that supports sensitive obligate species.

WILDLIFE RESOURCE	SENSITIVITY	POTENTIAL IMPACT FROM THE PROPOSED PROJECT
Greater sage-grouse lek – within 0.6 to 2 miles of the proposed transmission line	Moderate	Disturb breeding grouse, lek abandonment, and reduction in breeding habitat that is slow to recover from disturbance.
Greater Sage-Grouse Connectivity Habitat	Moderate	Reduction in habitat (abundance and quality) that serves as a movement corridor between seasonally used areas.
Mule deer year-round habitat	Moderate	Disturb sensitive habitat during a stressful period to mule deer.
Riparian Intermittent Stream	Moderate	Reduction in habitat (abundance and quality) that is slow to recover to pre-disturbance state.
Sagebrush and Rabbitbrush/Annual Grassland	Moderate	Reduction in habitat (abundance and quality) that is slow to recover to pre-disturbance state.
Salmonid spawning area	Moderate	Reduce quality of a fragile habitat.
Agricultural land	Low	Reduce habitat (abundance and quality).
Greater sage-grouse lek – within 2 to 3 miles of the proposed transmission line	Low	Disturb breeding grouse, lek abandonment, and reduction in breeding habitat.
Greater Sage-Grouse Expansion Habitat	Low	Reduce habitat (abundance and quality).
Urban/developed	Low	Reduce habitat (abundance and quality).

4.3.1.3 Impact Types

Impacts to wildlife resources were measured on multiple scales to include: 1) Biological Disturbance; 2) Biological Change; and 3) Magnitude. Magnitude was evaluated in terms of intensity and duration scales. Impacts can vary in intensity from no change or only a slightly discernible change, to a full modification of the environment. In addition to intensity, duration was evaluated in terms of short-term and long-term impacts.

Biological Disturbance

Many species are sensitive to disturbance by the presence of humans, which can occur through construction activities and road access. Increased disturbance can result in reductions in productivity, increases in energy expenditures, or displacements in population (Bennett 1991; Mader 1984); however, the magnitude of impact to the species often depends on the specific disturbance. Examples of disturbance from transmission line presence are collision risk, avoidance behavior, and increased predator perching habitat. Disturbance from access roads includes human disturbance of breeding areas (e.g., sage-grouse leks), nests (e.g., ferruginous hawk), and dens and burrows (e.g., burrowing owl).

Potential disturbance to wildlife species associated with the proposed Project includes any activities, either short- or long-term, that would disrupt species thereby temporarily or permanently displacing animals from where they would typically occur. The wildlife species that occur in different vegetation communities are described in Section 3.3 (Wildlife and Special Status Wildlife Species). Disruption from the proposed Project was analyzed by taking into account: (1) increased noise levels during construction; (2) increased noise levels from the energized transmission line; (3) increased vehicle traffic during construction and for maintenance activities; (4) increased off-highway vehicle (OHV) use and other recreational traffic because of increased access routes; and (5) the presence of structures and conductors (collision risk and perching opportunities). In some areas, suitable habitat of similar quality is available nearby and would support displaced animals without impacting population levels.

Biological Change

Impacts resulting in change include modification of habitat type, species composition, species behavior, or population size. Habitat change in this analysis was generally associated with: (1) long-term habitat loss through vegetation removal and/or destruction; (2) habitat conversion (e.g., removal of shrubland and reclamation to grassland); (3) habitat degradation (e.g., introduction or spread of noxious weeds and invasive species; and (4) introduced habitat features not currently present (e.g., perching habitat associated with structures). Biological change from habitat loss, habitat conversion, and habitat degradation was evaluated through a geographic information system (GIS) data analysis of vegetation communities within the Project area and equated to habitat. Based on the disturbance model, habitat loss was calculated within each habitat type by disturbance type and by short- or long-term duration.

The general types of impacts caused by the construction, operation and maintenance of the proposed Project are presented in Table 4.3-2.

TABLE 4.3-2 SUMMARY OF IMPACTS TO WILDLIFE RESOURCES

IMPACT	PROJECT ATTRIBUTE	POTENTIAL IMPACT AND WILDLIFE RESOURCE EFFECT	IMPACT CATEGORY AND LONGEVITY
Direct injury and/or mortality to vegetation	Vehicle and human trampling during construction and maintenance.	Destruction, mortality, and injury to vegetation, reduction in habitat quantity and quality.	Biological disturbance and Biological change. Short-term in areas adjacent to the right-of-way (ROW). Long-term in areas associated with clearing and grading for access roads and transmission structures.
Direct injury and/or mortality to wildlife	Vehicle and human trampling during construction and maintenance.	Destruction, mortality, and injury to wildlife species. Species with limited mobility or that occupy burrows or nests are most susceptible. Destruction of nests.	Biological change. Short-term within the footprint from construction, structures and in areas adjacent to the ROW. Long-term for access roads.
Ground disturbance	Construction, structure foundations, access roads.	Habitat quantity and quality reduction, habitat degradation.	Biological disturbance and Biological change. Short-term within the footprint from construction. Long-term from access roads and structures.
Fugitive dust generation	Construction, maintenance and repair activities.	Reduced photosynthesis, impaired species respiration, reduction in habitat quality.	Biological disturbance and Biological change. Short-term within the footprint from construction. Long-term from access roads.
Exposure to pollutants	Chemical spills from construction and maintenance.	Reduced survival, population and growth.	Biological disturbance. Short-term, localized to construction and maintenance sites.

IMPACT	PROJECT ATTRIBUTE	POTENTIAL IMPACT AND WILDLIFE RESOURCE EFFECT	IMPACT CATEGORY AND LONGEVITY
Noise, human presence	Construction, maintenance, and repair activities.	Displace wildlife, disrupt breeding, migration, foraging.	Biological disturbance. Short-term within the footprint from construction. Long-term from access roads.
Fire	Construction and maintenance equipment, human access.	Habitat loss and reduction in habitat quality through the potential post-fire establishment of noxious weeds.	Biological disturbance and Biological change. Short-term in the construction footprint for the transmission line. Long-term for access roads.
Avian collisions	Conductors, shield wires, and guy-wires.	Reduction in avian populations; waterfowl and upland game birds would be most susceptible.	Biological disturbance. Long-term for the Project ROW.
Increased predator habitat	Transmission structures	Raptors and corvids (e.g., crows, ravens, jays) exploit perching opportunities, resulting in increased predation on small mammal and avian species.	Biological disturbance and Biological change. Long-term for the Project ROW.

4.3.2 Impact Levels (High, Moderate, Low, No Identifiable Impact)

Resource sensitivity levels (Table 4.3-1) and impact types (Table 4.3-2) were the primary factors used in estimating potential impact levels for wildlife resources. In addition, the resource quality (context or the existing condition of the resource) and resource quantity (the amount of the resource potentially affected) were also considered. These criteria were applied to develop impact level categories of high, moderate, low and no identifiable. The impact levels are defined as follows:

High – A high level of impact would result if the construction, operation, or maintenance of the proposed Project would potentially cause a significant or substantial adverse biological change or biological disturbance to wildlife resources.

Moderate – A moderate level of impact would result if the construction, operation, or maintenance of the proposed Project would potentially cause some adverse biological change or biological disturbance (ranging between significant and insignificant) to wildlife resources.

Low - A low level of impact would result if the construction, operation, or maintenance of the proposed Project would potentially cause an insignificant or minor adverse biological change or biological disturbance to wildlife resources.

No Identifiable - No identifiable impact would be indicated where no measurable impact would occur to wildlife resources.

4.3.3 Impacts Common to All Route Segments

Impacts from construction, operation and maintenance of the proposed Project would impact wildlife populations residing in or near the Project area; however, the extent of the impact would depend on the species, habitat requirements, and availability of suitable habitat within and near the right-of-way (ROW). General impacts would include habitat loss and degradation; increased risk of mortality due to collision or increased human access to habitat; generation of fugitive dust; exposure to pollutants; fire; increased predator habitat; disturbance during critical periods, such as nesting or wintering periods; and temporary disturbance and displacement due to construction activities. Construction activities are generally short-term and related to transmission structure installation, staging areas, access road improvements and new access road construction, and temporary pulling/tensioning sites.

The project design features and environmental protection measures described in Section 2.5 (Project Design Features Common to Action Alternatives) have been incorporated into the Project design and would be implemented during construction and operation of the proposed Project. These measures are designed to avoid or minimize environmental impacts from Project construction, operation and maintenance activities and are items that Pacific Power has committed to implement as part of the Project development. Project design features will be reviewed, revised, and developed further, as appropriate, to reduce impacts associated with specific resource concerns (e.g., cultural, biological, visual resources, etc.), and will be included in the Plan of Development (POD) for this Project. The POD will be reviewed and approved by the federal land management agencies, and made a part of the authorizations to be issued for use of federal lands by the proposed Project. Initial impacts described below take into account the implementation of these project design features.

4.3.3.1 Habitat

The proposed Project would result in biological change by directly affecting habitat through the temporary trampling of herbaceous vegetation, the partial removal of aboveground plant cover, and the complete removal of vegetation due to construction of the transmission line, access roads and temporary work spaces. Vegetation would be permanently removed and disturbed at structure bases and along permanent access roads. Vegetation removal could have a variety of effects on habitat including changes in community structure and composition. The degree of impact depends on the type and amount of vegetation affected and the rate at which vegetation would regenerate after construction. Within the Project area, the recovery of vegetation following revegetation would vary by plant community type following construction. Grasslands and herbaceous wetlands would generally recover within five to seven years; while shrublands (e.g., sagebrush) may require 30 to 50 years (Olson et al. 2000; Lesica et al. 2005). Project design features implemented during construction and operation are anticipated to be effective at minimizing the amount of vegetation that would be impacted (refer to Section 2.5 Project Design Features Common to Action Alternatives). Project design features include: maintaining intact vegetation wherever possible; minimizing the blading of native plant communities during construction, consistent with safe construction practices; utilizing overland travel where feasible; and reseeding disturbed areas using an Agency approved mixture of native and non-native species or seed for revegetation as detailed in the POD. Direct short-term and long-term habitat disturbance is presented in Tables 4.3-3 and 4.3-4 and discussed for each route segment in Section 4.3.4.

Indirect impacts to habitat could occur during construction through the generation of fugitive dust. High levels of fugitive dust can impact the growth of some organisms (reduced photosynthesis) and can impact drinking water. Most impacts from fugitive dust would last only until the next rain event, when the dust is washed away and diluted. Potential impacts from the generation of fugitive dust would be transient as construction progresses and would not occur in one area for a long duration. Prior to construction, a Dust Control Plan would be developed as part of the POD and would identify dust control measures to be implemented during construction. Fugitive dust emissions would also be reduced by implementing the following Project design features: limiting ground disturbing activities during construction; rehabilitating new or improved access roads, where practicable; utilizing water trucks to control dust during construction; and covering construction materials that are a source of blowing dust (e.g., dirt piles and open pits).

Biological change through habitat degradation could occur because ground disturbance and vegetation removal can indirectly increase the potential for the introduction and spread of noxious weeds and invasive weeds (Olson 1999; Levine et al. 2003). Non-native plant invasions have the potential to alter wildlife habitat quality by outcompeting native plants, altering the natural fire regime, and by changing ecosystem processes (e.g., nitrogen cycling). Construction of access roads and the movement of construction equipment and other vehicles along these roads would increase the potential for the spread of noxious weeds in the affected areas (Sheley et al. 1999; Gelbard and Belnap 2003). Project design features would be implemented to reduce the potential spread of noxious weeds and invasive species from Project activities and include the following: reseeding disturbed areas with certified weed-free materials (e.g., seed, borrow material, straw waddles and bale barriers); washing all equipment before entering the Project area and when leaving areas where noxious weeds are present; closing or rehabilitating new or improved access roads that are not required for maintenance; and complying with all federal, state and county noxious weed control regulations and guidelines. In addition, a Noxious Weed and Invasive Plant Management Plan would be developed in consultation with land management agencies and local weed control districts, and would be incorporated into the final POD.

Biological change through habitat modification and degradation could occur in the Project area by a wildland fire event. Non-native plants, such as cheatgrass, create a more continuous fuel bed than native bunchgrasses, resulting in an increased risk of wildfire (Brown 2000; Paysen et al. 2000). In addition, increased use of access roads and the Project ROW could lead to an increase in fire danger from campfires, un-extinguished cigarettes, and vehicle exhaust systems coming into contact with dry vegetation. To minimize the potential for wildland fire and loss of wildlife habitat, the following Project design features would be implemented: all applicable fire laws and regulations would be observed during the construction period and construction personnel would be advised of their responsibilities under the applicable fire laws and regulations, including taking practical measures to report and suppress fires; a Fire Protection and Control Plan would be developed and incorporated into the POD; the development and implementation of a Noxious Weed and Invasive Plant Management Plan; and closing or rehabilitating new or improved access roads that are not required for maintenance. See Section 4.12 Wildland Fire Ecology and Management for more information on potential wildland fire impacts.

TABLE 4.3-3 SUMMARY OF SHORT-TERM DISTURBANCE TO HABITAT TYPE BY ROUTE SEGMENT

ROUTE SEGMENT	HABITAT TYPE– ACRES DISTURBED, TOTAL ACRES (Ac) PRESENT WITHIN PROJECT AREA, PERCENT (%) OF HABITAT TYPE DISTURBED WITHIN PROJECT AREA BY ROUTE SEGMENT[1]																													
	ANNUAL GRASSLAND			BASALT CLIFFS/ROCK			INTERMITTENT STREAM/GULLY			PERENNIAL GRASSLAND			RABBITBRUSH/ ANNUAL GRASSLAND			RIPARIAN			SAGEBRUSH/ ANNUAL GRASSLAND			SAGEBRUSH/ PERENNIAL GRASSLAND			TREES (ASPEN & POPLAR)			OTHER[2]		
	Ac Disturbed	Ac Present within Project Area	% Disturbed within Project Area	Ac Disturbed	Ac Present within Project Area	% Disturbed within Project Area	Ac Disturbed	Ac Present within Project Area	% Disturbed within Project Area	Ac Disturbed	Ac Present within Project Area	% Disturbed within Project Area	Ac Disturbed	Ac Present within Project Area	% Disturbed within Project Area	Ac Disturbed	Ac Present within Project Area	% Disturbed within Project Area	Ac Disturbed	Ac Present within Project Area	% Disturbed within Project Area	Ac Disturbed	Ac Present within Project Area	% Disturbed within Project Area	Ac Disturbed	Ac Present within Project Area	% Disturbed within Project Area	Ac Disturbed	Ac Present within Project Area	% Disturbed within Project Area
1a*	5.3	3,167	<1	0	0	0	0	1	0	0	145	0	0	0	0	0	5	0	0	0	0	2.2	335	<1	0	<1	0	2.7	1,064	<1
1b*	6.7	8,342	<1	0	0	0	0	14	0	10.4	3,688	<1	1.9	15	12.6	0	61	0	0	5	0	23.1	5,147	<1	0.4	1	29	4.1	592	<1
1c	27.1	8,957	<1	0	0	0	0.4	14	2.9	3.7	3,399	<1	1.1	15	7.3	0	60	0	0	5	0	11.3	4,702	<1	0	1	0	4.3	1,203	<1
2a*	3.6	2,140	<1	0	0	0	0	4	0	0.4	184	<1	0	0	0	0	41	0	0	0	0	0	745	0	0	0	0	0	138	0
2b	11.7	4,529	<1	0	1	0	1.1	11	10	2.5	1152	<1	0	0	0	0	0	0	0	0	0	40.3	13,856	<1	0	0	0	4	3,379	2.5
2c*	21.7	7,062	<1	0	<1	0	0	14	0	0.4	412	<1	0	0	0	0	0	0	0	<1	0	16.8	6,968	<1	0	0	0	27.2	10,645	<1
2d*	2.6	60	4	0	5	0	0	5	0	2.6	503	<1	0	0	0	0	<1	0	0	0	0	21.3	9,960	<1	0	<1	0	0	340	0
3a*	0	42	0	0	0	0	0	0	0	0	2.2	0	0	0	0	0	0	0	0	2	0	1.1	2,120	<1	0	0	0	0	28	0
3b	1.9	435	<1	0.3	21	1.5	0	1	0	2.5	3,908	<1	1.7	9	19.1	0.7	415	<1	0.4	6	6.8	19.2	16,413	<1	5.9	21	28	44.4	8,363	<1
3c*	11.5	6,473	<1	1.1	8	13	0	<1	0	0	2.9	0	8.2	40	20.4	1.2	173	<1	2.2	618	<1	37.7	14,031	<1	0	<1	0	33.6	12,211	<1

[1]Project area is defined as a two mile corridor; One mile from either side of route segment centerlines. [2]Other category includes agriculture, developed/residential areas and open water.
*Route segments that comprise the Agency Preferred Alternative.

TABLE 4.3-4 SUMMARY OF LONG-TERM DISTURBANCE TO HABITAT TYPE BY ROUTE SEGMENT

ROUTE SEGMENT	HABITAT TYPE– ACRES DISTURBED, TOTAL ACRES PRESENT WITHIN PROJECT AREA, PERCENT (%) OF HABITAT TYPE DISTURBED WITHIN PROJECT AREA BY ROUTE SEGMENT[1]																													
	ANNUAL GRASSLAND			BASALT CLIFFS/ROCK			INTERMITTENT STREAM/GULLY			PERENNIAL GRASSLAND			RABBITBRUSH/ ANNUAL GRASSLAND			RIPARIAN			SAGEBRUSH/ ANNUAL GRASSLAND			SAGEBRUSH/ PERENNIAL GRASSLAND			TREES (ASPEN & POPLAR)			OTHER[2]		
	Ac Disturbed	Ac Present within Project Area	% Disturbed within Project Area	Ac Disturbed	Ac Present within Project Area	% Disturbed within Project Area	Ac Disturbed	Ac Present within Project Area	% Disturbed within Project Area	Ac Disturbed	Ac Present within Project Area	% Disturbed within Project Area	Ac Disturbed	Ac Present within Project Area	% Disturbed within Project Area	Ac Disturbed	Ac Present within Project Area	% Disturbed within Project Area	Ac Disturbed	Ac Present within Project Area	% Disturbed within Project Area	Ac Disturbed	Ac Present within Project Area	% Disturbed within Project Area	Ac Disturbed	Ac Present within Project Area	% Disturbed within Project Area	Ac Disturbed	Ac Present within Project Area	% Disturbed within Project Area
1a*	0.9	3,167	<1	0	0	0	0	1	0	0	145	0	0	0	0	0	5	0	0	0	0	0.4	335	<1	0	<1	0	0.4	1,064	<1
1b*	1.7	8,342	<1	0	0	0	0	14	0	3.1	3,688	<1	0.5	15	3	0	61	0	0	5	0	5.1	5,147	<1	0.1	1	7	0.7	592	<1
1c	13.6	8,957	<1	0	0	0	0.1	14	1	2	3,399	<1	0.6	15	4	0	60	0	0	5	0	5.9	4,702	<1	0	1	0	0.8	1,203	<1
2a*	1.9	2,140	<1	0	0	0	0	4	0	0.2	184	<1	0	0	0	0	41	0	0	0	0	0	745	0	0	0	0	0	138	0
2b	5.7	4,529	<1	0	1	0	0.7	11	6	1.6	1152	<1	0	0	0	0	0	0	0	0	0	25.5	13,856	<1	0	0	0	2.3	3,379	<1
2c*	9.4	7,062	<1	0	<1	0	0	14	0	0.1	412	<1	0	0	0	0	0	0	0	<1	0	8.0	6,968	<1	0	0	0	5.2	10,645	<1
2d*	1.4	60	2	0	5	0	0	5	0	1.2	503	<1	0	0	0	0	<1	0	0	0	0	12.7	9,960	<1	0	<1	0	0	340	0
3a*	0	42	0	0	0	0	0	0	0	0	2.2	0	0	0	0	0	0	0	0	2	0	0.1	2,120	<1	0	0	0	0	28	0
3b	0.4	435	<1	0.2	21	1	0	1	0	0.7	3,908	<1	0.3	9	3	0.4	415	<1	0.1	6	2	6.1	16,413	<1	1.2	21	6	21.8	8,363	<1
3c*	3.8	6,473	<1	0.6	8	7	0	<1	0	0	2.9	0	2.4	40	6	0.3	173	<1	0.6	618	<1	11.9	14,031	<1	0	<1	0	7.3	12,211	<1

[1]Project area is defined as a two mile corridor; One mile from either side of route segment centerlines. [2]Other category includes agriculture, developed/residential areas and open water.
*Route segments that comprise the Agency Preferred Alternative.

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4.3.3.2 General Wildlife

Construction and maintenance of the proposed Project has the potential to cause biological disturbance through wildlife injury or mortality from collisions or interactions with construction and maintenance equipment and potential harm due to the presence of transmission line structures (i.e., collision). Bird collisions with overhead wires typically involve large, less maneuverable species such as pelicans, or species that fly at high speeds and low altitudes such as ducks (CEC 2002; Manville 2005; PacifiCorp 2006). Other factors that influence the likelihood of collisions with wires include the habitat type where lines are located, age of birds (juveniles are more likely than adults to collide with lines), and environmental characteristics (e.g., visibility, weather, time of day). Collisions are more likely to occur in areas with high concentrations of birds in close proximity to lines (CEC 2002; PacifiCorp 2006). Available literature indicates that waterfowl, including ducks, geese, swans, cranes, and shorebirds appear to be most susceptible to collisions when power lines are located near wetlands (Erickson et al. 2005; Faanes 1987; Anderson 1978). In general, raptors are considered less susceptible to collisions with overhead wires than other groups of birds; however an increased risk of collision occurs where there are repeated flights across power lines, especially in bad weather or pursuing prey (APLIC 1994; APLIC 2006; Manosa and Real 2001). Project design features would be incorporated into Project design and implemented to minimize wildlife injury and mortality associated with the proposed Project. The Project Proponent's Bird Management Program Guidelines includes protocols for documenting the incidence of mortalities from collision with the line and problem nests, contacting the appropriate resource agency and additional actions to be taken to reduce mortalities (e.g., installing bird flight diverters or marking static wires in sensitive areas when warranted; PacifiCorp 2006). A wildlife protection plan would be developed identifying specific measures to protect biological resources. Protection measures could include timing restrictions, ROW clearance surveys prior to construction and the use of biological monitors to protect biological resources during construction. In addition, adherence to reasonable speed limits in construction areas would help to reduce the potential for wildlife collision.

Raptor electrocution on transmission lines has received significant attention and has resulted in the development of 'avian-safe' or 'raptor-safe' design guidelines for new transmission lines (APLIC 2006; APLIC and USFWS 2005). Research has indicated that most avian electrocutions occur on low-medium voltage lines (four kilovolt [kV] to 69 kV) on which conductor spacing is small and can be bridged by large birds (APLIC and USFWS 2005). Large birds are more at risk to electrocution; however small birds can be electrocuted on closely spaced energized equipment such as transformers (APLIC 2006). The industry standard for avian protection includes a minimum horizontal separation of 60 inches between conductors (APLIC 2006). This separation is intended to allow sufficient clearance for eagles; however, applying this standard would also help protect smaller birds, including ospreys, hawks, owls, wading birds, and songbirds (PacifiCorp 2006). The proposed 230 kV transmission line on H-frame structures would have a horizontal separation between conductors of 230 inches (19.5 feet) and would be avian-safe with no potential for electrocution of raptors or other bird species. The proposed Project would result in no identifiable impacts with regard to avian electrocution.

Transmission line structures provide substrates for perching, roosting and nesting for some avian species (i.e., raptors and corvids), particularly in open areas where natural substrates are limited (APLIC 2006; Knight et al. 1995; Steenhof et al. 1993). Biological disturbance to wildlife species by the presence of a transmission line could negatively impact nearby prey species such as small mammals and avian species by increasing both the predation rate and the level of predatory harassment experienced (Call and Maser 1985; Connelly et al. 2000; Vander Haegen et al. 2002). The impact would be greatest where other tall structures, including transmission lines, do not currently exist. The distance that these effects could extend from the transmission line depends on the hunting range of the predator species. Some raptor species may benefit from the proposed Project by the creation of new perching sites and increased visibility of prey species. To assess impacts to wildlife species from the presence of additional perching sites, the total number of structures per route segment was estimated and, using a conservative approach, an assumption of one perch per structure was made. In general, the number of perching opportunities for a given route segment is directly related to its length. Table 4.3-5 presents the number of transmission structures for the proposed Project by route segment and identifies if they are not located within 0.25 mile of an existing line. Impacts from additional perching opportunities are discussed further for sage-grouse and each route segment in Sections 4.3.3.2 and 4.3.4.

TABLE 4.3-5 SUMMARY OF NEW TRANSMISSION STRUCTURES THAT WOULD BE INSTALLED BY ROUTE SEGMENT

ROUTE SEGMENT	STRUCTURE TYPE				TOTAL ESTIMATED NUMBER OF NEW STRUCTURES	ESTIMATED NUMBER OF NEW STRUCTURES NOT LOCATED WITHIN 0.25 MILE OF AN EXISTING TRANSMISSION LINE
	H-FRAME TANGENT	SINGLE POLE TANGENT	ANGLE-GUYED	STEEL LATTICE (COLUMBIA RIVER CROSSING)		
1a*	3	32	5		40	18
1b*	85	0	4		89	85
1c	87	0	5		92	88
2a*	6	0	1		7	7
2b	112	0	4		116	116
2c*	114	7	3		124	60
2d*	45	1	4		50	50
3a*	0	2	1		3	0
3b	0	179	0	2	181	160
3c*	91	75	18	2	186	119

Source: Number of structures and types is based on preliminary engineering and design.
*Route segments that comprise the Agency Preferred Alternative.

Another direct impact on wildlife from the construction of the proposed Project would be visual (human and construction equipment presence) and noise disturbance, which would make habitat temporarily less suitable for some wildlife species. Visual disturbance could impact some wildlife species by causing them to temporarily leave habitat in the construction area. This could have negative impacts by causing them to: move to areas with less suitable forage and cover and to sites with increased exposure to predation; disrupting breeding and migration activities; and increasing their energy expenditure. The increases in noise and visual disturbance from construction would be short-term and localized. To minimize disturbance to wildlife from noise and human presence, the following Project design features would be implemented: restricting construction and maintenance activities during sensitive periods; adhering to reasonable speed limits in construction areas; and closing or rehabilitating new or improved access that is not required for maintenance.

4.3.3.3 Federally Threatened, Endangered and Candidate Species

Bull Trout

Bull trout occur within the reach of the Columbia River that would be spanned by the proposed Project and the reach of the Columbia River is within critical designated habitat. It is unlikely that spawning occurs in streams within the Project area. No structure or road construction work would occur within the Columbia River. For the Columbia River crossing the structures would be approximately 200 foot tall lattice steel structures for the up to 2,800 foot crossing. Erosion would be minimized by applying and maintaining standard erosion and sediment control methods. These may include straw waddles, straw bale barriers and silt fencing which would be placed at construction boundaries. Specific erosion and sediment control measures and locations would be specified in a Stormwater Pollution Prevention Plan (SWPPP). The implementation of project design features are anticipated to be effective at eliminating impacts to bull trout; no identifiable impacts to bull trout or bull trout habitat are anticipated to occur through construction, operation and maintenance of the proposed Project.

Chinook Salmon
The reach of the Columbia River that would be spanned by the proposed Project is within the migratory corridor and designated critical habitat for the Upper Columbia River Spring Run Chinook salmon. It is unlikely that spawning occurs in streams within the Project area. No structure or road construction work would occur within the Columbia River. For the Columbia River crossing the structures would be approximately 200 foot tall lattice steel structures for the up to 2,800 foot crossing. Erosion would be minimized by applying and maintaining standard erosion and sediment control methods. These may include straw waddles, straw bale barriers and silt fencing which would be placed at construction boundaries. Specific erosion and sediment control measures and locations would be specified in a SWPPP. The implementation of project design features are anticipated to be effective at eliminating impacts to Chinook salmon; no identifiable impacts to Chinook salmon or its habitat are anticipated to occur through construction, operation and maintenance of the proposed Project.

Greater Sage-Grouse
Potential impacts to greater sage-grouse from power lines may include both biological change and biological disturbance, such as: 1) spread and invasion of exotic species; 2) collision and electrocution; 3) decreased lek recruitment near lines; 4) increased predation; 5) degraded habitat; and 6) direct habitat loss (USFWS 2010b). Additional impacts related to construction and operation of the proposed Project could include noise and human activity associated with construction activities, vehicle strikes during active construction or maintenance, increased human access, and displacement of sage-grouse by predators. In addition to impacts described above for general wildlife species, potential impacts to greater sage-grouse are assessed in more detail below.

The small size of the two remaining greater sage-grouse populations in Washington makes viability and persistence likely dependent upon recovery efforts. Small populations are affected by loss of genetic variability, inbreeding, and predation pressure, and are at risk from extreme weather conditions or fires (Stinson et al. 2004). Within the historical range of sage-grouse in Washington, approximately 6,203,982 acres (44 percent) of steppe habitats remain (Stinson et al. 2004). One of the largest contiguous blocks of remaining intact shrub-steppe habitat occurs on the Joint Base Lewis-McChord Yakima Training Center (JBLM YTC), with approximately ten leks active since 1999. As of 2011, the 22-year population average on the JBLM YTC is 281 birds (Dunham 2011). None of the proposed route segments occur within 0.6 mile of an active or inactive lek or crosses through quality habitat within the JBLM YTC, where known lekking occurs. Route Segment 1b occurs within 0.6 mile of a historic lek where no activity has been observed throughout the past 24 months (JBLM YTC and Priority Habitats and Species [PHS] data). Route Segment 1b is just within the JBLM YTC boundary for its entire length, on or paralleling an existing disturbed JBLM YTC firebreak. Route Segments 1c, 2c, and 3b parallel the JBLM YTC fence line, but are not within the JBLM YTC boundary. Current sage-grouse habitat within the Project area has been removed and degraded by the presence of other transmission lines, roads, highways and interstates, JBLM YTC training operations, non-native plant invasions, fire, habitat alteration by livestock grazing and conversion of sagebrush steppe to residential and agricultural land (JBLM YTC 2002; Rice et al. 2008; Shaw et al. 1999). None of the proposed route segments bisect high quality sagebrush habitat or lekking grounds and is, for the most part, on the periphery of designated priority habitats.

JBLM YTC greater sage-grouse telemetry data (2010) indicates that individual sage-grouse do occasionally move outside of the JBLM YTC border; however, most of the birds appear to remain within the JBLM YTC boundary. Telemetry data show individual grouse movement outside of JBLM YTC south and west of Route Segments 1b and 1c, south of 2b and 2c, and east of 3b.

Washington and the JBLM YTC have established habitat designations for sage-grouse. Washington's sage-grouse management units have been adopted by the Bureau of Land Management (BLM) as tiered priority habitat units for the purposes of protecting and recovering this species (BLM 2010a; Stinson et al. 2004). The four priority habitat units are: Regularly Occupied Habitat (Tier 1), Connectivity Habitat (Tier 2), Occasionally Occupied Habitat (Tier 3), and Expansion Habitat (Tier 4). Refer to Section 3.3.2.2, Federally Threatened, Endangered and Candidate Species, for more information on the four priority habitat units. Tiers 1, 3, and 4 are present within the Project area. The number of acres of short- and long-term disturbance to tiered priority habitat units is presented in Tables 4.3-6 and 4.3-7. Because the route segments vary in length, this table also presents the percent of each route segment that would be disturbed by Tier. Short-term and long-term habitat disturbance to sage-grouse tiered priority habitats is discussed for each route segment in Section 4.3.4. A map showing sage-grouse Tiered Priority Habitats is included in Appendix A.

JBLM YTC has two sage-grouse habitat protection zone designations, Primary and Secondary (JBLM YTC 2002). The Primary Protection Zone is approximately 78,600 acres and includes areas that are considered as essential sage-grouse habitat. Specific management within these areas includes seasonal restrictions of military activities, periodic closure of selected areas to training and habitat restoration/monitoring. The Secondary Protection Zone is approximately 24,460 acres and provides indirect benefits to sage-grouse. The two route segments that are within the JBLM YTC boundary, Route Segments 1b and 1c, occur within one or both of these Protection Zones. Approximately 54 percent of the total short-term disturbance for Route Segment 1b would occur within JBLM YTC's Primary Protection Zone. Approximately 12 percent of the total long-term disturbance for Route Segment 1b would occur within the Primary Protection Zone and 6.4 percent would occur within JBLM YTC's Secondary Protection Zone. A small percentage of the total disturbance for Route Segment 1c would occur within JBLM YTC's Secondary Protection Zone: 0.6 percent of the short-term and 0.1 percent of the long-term disturbance. As both the Primary and Secondary Protection Zones overlap designated Tier 1, Regularly Occupied Habitat, JBLM YTC Protection Zones will not be discussed further. A map showing sage-grouse Tiered Priority Habitats and JBLM YTC Protection Zones is included in Appendix A.

Using existing disturbed areas such as improved roads, implementing noxious weed control measures and reseeding disturbed areas would minimize the amount of habitat altered and loss due to the construction of proposed Project. Recovery of sage-grouse habitat following revegetation would vary by plant community type following construction. Grasslands and herbaceous wetlands would generally recover within five to seven years, while shrublands may require 30 to 50 years (Olson et al. 2000; Lesica et al. 2005.). See Section 4.3.4 for a discussion of sage-grouse habitat present within each route segment. Refer to Sections 4.2 Vegetation and Special Status Plant Species and 4.12 Wildland Fire Ecology and Management for more information on vegetation and fire impacts.

Greater sage-grouse could experience mortality through direct contact with the line (e.g., collision and electrocution) and vehicles (e.g., nests and individuals). The risk of greater sage-grouse mortalities occurring as a result of electrocution is very low. The industry standard for avian protection, developed by APLIC, includes a minimum horizontal separation of 60 inches between conductors (APLIC 2006). This separation is intended to allow sufficient clearance for eagles; however, applying this standard would also help protect greater sage-grouse (PacifiCorp 2006). Because research data on sage-grouse collisions with power lines are minimal, the number of sage-grouse collisions with transmission lines is difficult to evaluate (Johnson and Holloran 2010). Although it is not possible to quantify impacts associated with each route segment, it can reasonably be assumed that those route segments that affect the greatest amount of sage-grouse habitat would also likely have the highest level of collision mortality. The implementation of project design features are anticipated to be effective at reducing the potential for injury or mortality to sage-grouse from collisions with vehicles, and include moving vehicles and equipment at slow speeds and restricting construction vehicle movement to pre-designated locations. In addition, direct mortality would be reduced by avoiding construction or maintenance activities within 0.6 mile of active leks from February to June and minimize disturbance from construction and development activities, particularly within 0.6 mile of breeding habitat from February through June.

As described above for general wildlife species, the presence of the transmission line could increase both the predation rate and the level of predatory harassment experienced by avian species, including greater sage-grouse, by increasing or consolidating populations of raptors and corvids (ravens and crows). Researchers have attributed disturbance and abandonment of leks to harassment and predation of greater sage-grouse by common ravens (Corvus corax), and various raptors perching on and hunting from overhead utility towers (Graul 1980; Coates et al. 2008). The impact would be greatest where other tall structures, including transmission lines, do not currently exist and would depend on the hunting range of the predator species. Sage-grouse avoidance of areas with tall structures is another concern associated with the presence of the transmission line, primarily associated with leks. Table 4.3-5 presents the number of structures for the proposed Project and the number of structures that are not located within 0.25 mile of an existing line. Locating the proposed line adjacent to existing transmission lines and in disturbed areas would reduce impacts to sage-grouse and their habitat. Potential impacts to sage-grouse from transmission line structures are discussed by route segment in Section 4.3.4.

Greater sage-grouse could be disturbed and displaced from habitats during critical breeding periods. Buffers recommended to protect sage-grouse from disturbance and displacements vary in the literature from within 0.6 mile to within three miles of the line (Connelly et al. 2000; ISAC 2006). With regard to energy development, including transmission lines, identifying what buffers are necessary and which key sage-grouse habitats need buffering is not adequately understood and can be difficult to define (Stiver et al. 2006). The WDFW Greater Sage-Grouse Recovery Plan states that activities that interfere with sage-grouse at or near leks (within 1.2 miles) should be avoided between 6 p.m. and 9 a.m. during February-April (Stinson et al. 2004). The Plan also states that construction activities should be minimized within 0.6 mile of breeding habitat during February to June. Connelly et al. (2000) recommended that power lines not be constructed within two miles of seasonal sage-grouse habitats. The Idaho Sage-Grouse Conservation Plan (ISAC 2006) recommended a three mile buffer be applied on each side to account for potential influences of avian predation. Recent guidance from BLM's Wyoming State Office (2010b) recommends the following: no surface disturbing activity or occupancy within a 0.6 mile radius of an occupied or undetermined-status sage-grouse lek; no or restricted surface disturbing activities or surface occupancy on or within a 0.25 mile radius of occupied or undetermined sage-grouse leks; and no surface disturbing and/or disruptive activities within two miles of an occupied or undetermined lek in suitable nesting and early brood-rearing habitat from March 15–June 30. A telemetry study conducted in California from 1998 to 2000 found that transmission lines may have effects on sage-grouse lek attendance at distances of over 12 miles. The data also showed that the mean survival of adult greater sage-grouse increased as the distance from a transmission line increased. However, it was concluded that the data did not indicate that these effects may be limiting to the population for leks more than three miles from the transmission line (Armentrout and Hall 2005). Through discussions with the USFWS and WDFW, protocol level aerial surveys for leks were conducted for this proposed Project within a three mile buffer on each side of all route alternatives. The three mile buffer was based on the research of Armentrout and Hall (2005). The results of the protocol level aerial surveys are presented in Appendix B-1, Sage-Grouse Aerial Lek Survey Report 2010 and 2011. A map showing greater sage-grouse observations is included in Appendix A. Due to the sensitivity of sage-grouse location information, this map is presented at a small-scale (WDFW 2011c; Guggenmos 2012).

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TABLE 4.3-6 SUMMARY OF SHORT-TERM DISTURBANCE TO DESIGNATED GREATER SAGE-GROUSE PRIORITY HABITAT (ACRES) AND THE PERCENT (%) OF TOTAL ROW DISTURBANCE THAT WOULD OCCUR WITHIN EACH MANAGEMENT AREA

		WASHINGTON GREATER SAGE-GROUSE PRIORITY HABITATS - ACRES DISTURBED, TOTAL ACRES PRESENT WITHIN PROJECT AREA, PERCENT (%) OF HABITAT DISTURBED WITHIN PROJECT AREA BY ROUTE SEGMENT[1]								
		TIER 1 –REGULARLY OCCUPIED HABITAT (416,031 ACRES)			TIER 3 – OCCASIONALLY OCCUPIED HABITAT (558,301 ACRES)			TIER 4 – EXPANSION HABITAT (411,345 ACRES)		
ROUTE SEGMENT	TOTAL ACRES OF SHORT-TERM DISTURBANCE	ACRES DISTURBED	ACRES PRESENT WITHIN PROJECT AREA	PERCENT DISTURBED WITHIN PROJECT AREA	ACRES DISTURBED	ACRES PRESENT WITHIN PROJECT AREA	PERCENT DISTURBED WITHIN PROJECT AREA	ACRES DISTURBED	ACRES PRESENT WITHIN PROJECT AREA	PERCENT DISTURBED WITHIN PROJECT AREA
1a*	10.2	9.7	3,816	0.3%	0	0	0	0	0	0
1b*	46.6	46.6	17,046	0.3%	0	820	0	0	0	0
1c	47.8	46.0	16,837	0.3%	1.8	1,519	0.1%	0	0	0
2a*	4.0	4.0	2,829	0.1%	0	423	0	0	0	0
2b	59.6	59.6	22,413	0.3%	0	516	0	0	0	0
2c*	66.1	60.7	18,801	0.3%	5.4	6,301	0.1%	0	0	0
2d*	26.5	26.5	9,984	0.3%	0	890	0	0	0	0
3a*	1.1	0	0	0	0.5	2,194	<0.1%	0	0	0
3b	77.0	54.1	17,702	0.3%	14.8	8,227	0.2%	0	0	0
3c*	95.5	6.7	2,495	0.3%	45.0	17,796	0.3%	13.2	3,291	0.4%

[1]No designated Tier 2, Connectivity Habitat, is present within the Project area. [2]Regularly Occupied Habitat includes a subset of the JBLM YTC and Rattlesnake Hills Management Units.
[3]Occasionally Occupied Habitat includes a subset of the Saddle Mountains and Rattlesnake Hills Management Units. [4]Expansion Habitat includes a subset of the Hanford Management Unit
*Route segments that comprise the Agency Preferred Alternative.

TABLE 4.3-7 SUMMARY OF LONG-TERM DISTURBANCE TO DESIGNATED GREATER SAGE-GROUSE PRIORITY HABITATS (ACRES) AND THE PERCENT (%) OF TOTAL ROW DISTURBANCE THAT WOULD OCCUR WITHIN EACH MANAGEMENT AREA

		WASHINGTON GREATER SAGE-GROUSE PRIORITY HABITATS - ACRES DISTURBED, TOTAL ACRES PRESENT WITHIN PROJECT AREA, PERCENT (%) OF HABITAT DISTURBED WITHIN PROJECT AREA BY ROUTE SEGMENT[1]								
		TIER 1 –REGULARLY OCCUPIED HABITAT (416,031 ACRES)			TIER 3 – OCCASIONALLY OCCUPIED HABITAT (558,301 ACRES)			TIER 4 – EXPANSION HABITAT (411,345 ACRES)		
ROUTE SEGMENT	TOTAL ACRES OF LONG-TERM DISTURBANCE	ACRES DISTURBED	ACRES PRESENT WITHIN PROJECT AREA	PERCENT DISTURBED WITHIN PROJECT AREA	ACRES DISTURBED	ACRES PRESENT WITHIN PROJECT AREA	PERCENT DISTURBED WITHIN PROJECT AREA	ACRES DISTURBED	ACRES PRESENT WITHIN PROJECT AREA	PERCENT DISTURBED WITHIN PROJECT AREA
1a*	1.8	1.8	3,816	<0.1%	0	0	0	0	0	0
1b*	11.3	11.3	17,046	0.1%	0	820	0	0	0	0
1c	23.1	22.5	16,837	0.1%	0.6	1,519	<0.1%	0	0	0
2a*	2.1	2.1	2,829	0.1%	0	423	0	0	0	0
2b	35.7	35.7	22,413	0.2%	0	516	0	0	0	0
2c*	22.7	21.6	18,801	0.1%	1.1	6,301	<0.1%	0	0	0
2d*	15.3	15.3	9,984	0.2%	0	890	0	0	0	0
3a*	0.1	0	0	0	0.1	2,194	<0.1%	0	0	0
3b	30.9	22.5	17,702	0.1%	5.4	8,227	0.1%	0	0	0
3c*	26.3	3.6	2,495	0.1%	12.9	17,796	0.1%	4.4	3,291	0.1%

[1]No designated Tier 2, Connectivity Habitat, is present within the Project area. [2]Regularly Occupied Habitat includes a subset of the JBLM YTC and Rattlesnake Hills Management Units.
[3]Occasionally Occupied Habitat includes a subset of the Saddle Mountains and Rattlesnake Hills Management Units. [4]Expansion Habitat includes a subset of the Hanford Management Unit
*Route segments that comprise the Agency Preferred Alternative.

In an effort to capture recent recommendations for sage-grouse, the corridor evaluated for impacts to sage-grouse habitat was three miles either side of the transmission line. In addition, impacts to active, inactive and historical leks were identified at distances of 0.6 mile, two miles and three miles. It was assumed that sage-grouse habitat and leks more than three miles from the transmission line would not be affected. For the comparison of route segments in terms of their impacts to sage-grouse leks, potential impacts were categorized as high (0 to 0.6 mile from the line), moderate (0.6 to 2.0 miles), low (2.0 to 3.0 miles) and no identifiable (greater than 3.0 miles).

Three of the route segments have active leks that occur within two miles, but only one route segment (1b) occurs within 0.6 mile of a historic lek (see 4.3-5). Active, inactive and historical leks are shown in Table 4.3-8 and discussed in Section 4.3.4 for each route segment. Active leks are defined as a lek that has been attended by male sage-grouse within the past 24 months (2010-2011). Inactive leks include any lek where sufficient data suggests that there was no strutting activity throughout the past 24 months (2010-2011). Historical leks include a formerly active lek site where no activity has been observed for greater than 24 months (JBLM YTC and PHS data). A map showing greater sage-grouse observations is included in Appendix A. Potential impacts to lekking sage-grouse would be minimized by implementing project design features such as avoiding construction or maintenance activities within 0.6 mile of active leks from February to June and minimize disturbance from construction and development activities, particularly within 0.6 mile of breeding habitat from February through June.

TABLE 4.3-8 GREATER SAGE-GROUSE LEKS AND OBSERVATIONS BY ROUTE SEGMENT

ROUTE SEGMENT	ACTIVE OR INACTIVE LEKS (NUMBER)[1]			PHS HISTORIC LEKS (NUMBER)[2]			OBSERVATIONS (NUMBER/TIME PERIOD)[3]	
	WITHIN 0.6 MILE	WITHIN 2 MILES	WITHIN 3 MILES	WITHIN 0.6 MILES	WITHIN 2 MILES	WITHIN 3 MILES	2001-2011	1988-2000
1a*	0	0	0	0	0	0	0	0
1b*	0	2	2	1	2	4	13	7
1c	0	2	2	0	2	3	10	7
2a*	0	0	0	0	0	0	0	0
2b	0	2	2	0	0	0	4	1
2c*	0	0	2	0	0	0	0	0
2d*	0	0	1	0	0	0	1	0
3a*	0	0	0	0	0	0	0	0
3b	0	1	1	0	0	0	2	0
3c*	0	0	0	0	0	0	4	0

Notes: [1]Active leks are defined as a lek that has been attended by male sage-grouse within the past 24 months (2010-2011). Inactive leks include any lek where sufficient data suggests that there was no strutting activity throughout the past 24 months (2010-2011). [2]Historical leks include a formerly active lek site where no activity has been observed for greater than 24 months (JBLM YTC and PHS data). [3]Includes sage-grouse observations within 0.5 mile of each route segment (JBLM YTC and incidental observations during sage-grouse habitat assessment survey).
*Route segments that comprise the Agency Preferred Alternative.

In addition, a habitat assessment field survey was conducted to address the seasonal habitat requirements of sage-grouse. Assessment protocol was based on BLM's framework for assessing sensitive species habitats (BLM 2000) and, in locations not surveyed, through aerial interpretation using adjacent survey information, 2001 JBLM YTC vegetation data, GAP data and fire history data. Sage-grouse habitat crossed is discussed for each route segment in Section 4.3.4.

The Washington Greater Sage-Grouse Recovery Plan (Stinson et al. 2004) identifies habitat loss and degradation from large-scale fires as the primary threat to remaining sage-grouse populations. The Plan states that fire prevention and management of training activities are critical to maintain sage-grouse populations on the JBLM YTC (Stinson et al. 2004). As described above in Section 4.3.3.1 and Section 4.12 (Wildland Fire Ecology and Management) there is the potential for increased risk of fire due to non-native plants, such as cheatgrass, creating a more continuous fuel bed, construction activities and increased use of access roads and the Project ROW following construction. To minimize the potential for wildland fire and loss of wildlife habitat, the following Project design features would be implemented: all applicable fire laws and regulations would be observed during the construction period and construction personnel would be advised of their responsibilities under the applicable fire laws and regulations, including taking practical measures to report and suppress fires; a Fire Protection and Control Plan would be developed and incorporated into the POD; the development and implementation of a Noxious Weed and Invasive Plant Management Plan; and closing or rehabilitating new or improved access roads that are not required for maintenance. See Section 4.12 Wildland Fire Ecology and Management for more information on potential wildland fire impacts.

The Washington Greater Sage-Grouse Recovery Plan's recovery goal is to establish a viable population of sage-grouse in a substantial portion of its historic range in Washington, with specific recovery objectives focusing on the breeding season population (Stinson et al. 2004). Recovery in Washington to a viable population will require an increase in population density, an expansion of occupied areas, and an improvement in habitat quality. Current and past management efforts focused on maintaining the existing populations and distributions of sage-grouse, while recovery efforts will focus on increasing the numbers and distribution of sage-grouse in Washington. Some of the designated management units will require substantial restoration efforts to support breeding and wintering populations and may require coordinated efforts between public and private land managers to maintain and improve habitat (Stinson et al. 2004). Conservation strategies to protect sage-grouse identified in the Recovery Plan are discussed below.

- Protect active sage-grouse leks from human disturbance – The Recovery Plan recommends minimizing disturbance from construction and development activities, particularly within 0.6 mile (1.0 kilometer) of breeding habitat during February - June. This strategy has been incorporated into the Project design features. In addition, there are no known active leks within 0.6 mile of any of the route segments.
- Protect nesting and brood rearing areas from disturbance – The Recovery Plan states that wherever possible, prevent disturbance in sage-grouse nesting and brood rearing habitat between March 1 and June 15. This strategy has been incorporated into the Project design features.
- New power lines and utilities should use existing corridors or be located so as to minimize collision risk and damage to habitat. To the extent practicable, the proposed Project has been sited to utilize existing corridors and disturbed locations. Project design features to minimize habitat disturbance and loss are discussed above.
- Protect habitat from fire – As discussed above, Project design features would be implemented that would reduce the potential for wildland fire through the construction and operation of the proposed Project.
- Protecting habitat – The Recovery Plan states that shrub-steppe restoration projects should use native seed sources, suppress cheatgrass and weeds, and reestablish sagebrush. As discussed above, Project design features would be implemented to protect sage-grouse habitat, including treating and preventing the spread of noxious weeds and invasive plants and reseeding disturbed areas with an agency approved seed mixture.

In summary, Route Segments 1b, 1c, and 2b are located within two miles of two known leks and Route Segment 3b is located within two miles of one known lek. Route Segment 1b is located directly within the boundary of JBLM YTC and is within 0.6 mile of a historic lek. The JBLM YTC population of greater sage-grouse is not known to lek outside of JBLM YTC, although incidental observations of non-lekking birds have occurred (JBLM YTC 2010). With the exception of Route Segment 3a, all of the Route Segments are located within, but primarily near the margin of, designated Tier 1, Regularly Occupied Habitat, for sage-grouse. However, considering the degraded nature of existing habitat, quality potential habitat is limited. Route Segment 2c is on the edge of the Tier 1 habitat and parallels an existing line for almost nine miles. Route Segments 1c, 2c, 3a, 3b, and 3c occur within and adjacent to Tier 3, Occasionally Occupied Habitat. The small portion of Route Segment 3c is within Tier 4, Expansion Habitat.

Gray Wolf
As of July 2011, Washington had five confirmed wolf packs, none of which are located in or near the Project area (WDFW 2011b). The proposed Project would have no identifiable impact on the gray wolf or its habitat.

Steelhead
The reach of the Columbia River that would be spanned by the proposed Project is within critical designated habitat for the Upper Columbia River steelhead (Oncorhynchus mykiss) DPS. It is unlikely that spawning occurs in streams within the Project area. No structure or road construction work would occur within the Columbia River. For the Columbia River crossing the structures would be approximately 200 foot tall lattice steel structures for the up to 2,800 foot crossing. Erosion would be minimized by applying and maintaining standard erosion and sediment control methods. These may include straw waddles, straw bale barriers and silt fencing which would be placed at construction boundaries. Specific erosion and sediment control measures and locations would be specified in a SWPPP. The implementation of project design features are anticipated to be effective at eliminating impacts to steelhead; no identifiable impacts to steelhead or its habitat are anticipated to occur through construction, operation and maintenance of the proposed Project.

Washington Ground Squirrel
Washington ground squirrels are not known to occur within the Project area, but suitable habitat exists. Potential impacts to Washington ground squirrel include both biological change and biological disturbance such as displacement from construction activities, injury or mortality from vehicle strikes or interactions with other equipment during construction or maintenance activities, and the permanent and temporary loss of grassland and shrub-steppe habitat. While construction activities would disturb individuals, their typical behavior response to retreat underground would not necessarily cause displacement from the area. Washington ground squirrels do not migrate, but instead move underground to hibernate during winter months. While these behaviors may be beneficial for avoiding dangers from predation, cold temperatures and lack of forage, construction-related ground disturbance may result in injury or mortality if individuals are underground in the Project corridor. In addition, the potential for impacts may increase following emergence from hibernation in late January through March and when the young appear aboveground in late March or April. Vehicle strikes during active construction or maintenance would most likely result in the highest incidences of injury or mortality to Washington ground squirrels. In addition, the installation of structures within grassland and shrub-steppe habitat would cause permanent loss of usable acreage, and may increase perching habitat for predators such as raptors.

While the long-term loss of grassland and shrub-steppe habitat would not be substantial (0.1 to 33 acres depending on the route segment), the already degraded nature of the surrounding ecosystem due to JBLM YTC training operations, non-native plant invasions, fire, habitat alteration by livestock grazing and conversion of sagebrush steppe to residential and agricultural land may increase its significance. Project design features implemented during construction and operation are anticipated to be effective at minimizing the amount vegetation that would be impacted (refer to Section 2.5 Project Design Features Common to Action Alternatives) and disturbance to Washington ground squirrel habitat. Project design features include: maintaining intact vegetation wherever possible; minimizing the blading of native plant communities during construction, consistent with safe construction practices; utilizing overland travel where feasible; and reseeding disturbed areas using an Agency approved mixture of native and non-native species or seed for revegetation as detailed in the POD. Short-term and long-term habitat disturbance is presented in Tables 4.3-3 and 4.3-4, and discussed for each route segment in Section 4.3.4. With the implementation of project design features described above, the scale of biological change and biological disturbance to Washington ground squirrel and its habitat is anticipated to be insignificant or minor; impacts levels are expected to be low.

4.3.4 Impacts Specific to Route Segments

Impacts to habitat and species are discussed below for each route segment. A map showing sensitive wildlife locations and management areas is included in Appendix A; however, due to the sensitive nature of location information, this map is presented at a small-scale (WDFW 2011c; Guggenmos 2012).

4.3.4.1 Route Segment 1a (Agency Preferred Alternative)

Habitat
Approximately 1.8 acres of long-term and 10.2 acres of short-term disturbance would occur through the construction of Route Segment 1a. The majority of both long-term and short-term disturbance for this route segment would occur in habitat that has been disturbed in the past and is currently dominated by exotic annual grasses (0.9 acre and 5.3 acres respectively; Tables 4.3-3 and 4.3-4). The remaining long-term disturbance would occur to: 0.4 acre of sagebrush/perennial grassland (less than one percent of sagebrush/perennial grassland within the Project area); and 0.4 acre of developed and agricultural areas. The remaining short-term disturbance would occur to: 2.2 acres of sagebrush/perennial grassland (less than one percent of the sagebrush/perennial grassland present within the Project area); and 2.7 acres of developed and agricultural areas.

Project design features would be implemented to minimize further habitat degradation and would include: maintaining intact vegetation wherever possible; minimizing the blading of native plant communities during construction, consistent with safe construction practices; utilizing overland travel where feasible; reseeding disturbed areas using an Agency approved mixture of native and non-native species or seed for revegetation as detailed in the POD; rehabilitating disturbed areas with certified weed-free materials (e.g., seed, borrow material, straw waddles and bale barriers); washing all equipment before entering the Project area and when leaving areas where noxious weeds are present; closing or rehabilitating new or improved access roads that are not required for maintenance; developing and incorporating a fire prevention plan into the POD; and complying with all federal, state and county noxious weed control regulations and guidelines. Noxious Weed and Invasive Plant Management Plan would be developed in consultation with land management agencies and local weed control districts, and would be incorporated into the final POD. In addition, a Fire Protection and Control Plan would be developed and incorporated in the POD. With the implementation of project design features described above, the scale of biological change to habitat is anticipated to be insignificant to significant; impacts levels to habitat are expected to be low for 1.7 miles and moderate for 0.5 mile (sagebrush/perennial grassland).
General Wildlife

Biological change could result in the long-term loss of grassland and sagebrush habitats and would affect primarily small and medium mammals (e.g., northern pocket gopher, deer mouse, badger, and coyote), reptiles and birds.

Biological disturbance would affect primarily less mobile or burrowing species which would be susceptible to direct mortality from construction and maintenance vehicles. Biological disturbance to wildlife through noise and human activity associated with construction activities would affect wildlife species on a short-term basis and could have negative impacts by: causing them to move to areas with less suitable forage and cover, and to sites with increased exposure to predation; disrupting breeding and migration activities; and increasing their energy expenditure. Increases in noise and visual disturbance from construction activities would be short-term, localized, and impacts are anticipated to be low. To minimize disturbance to wildlife from noise and human presence, the following project design features would be implemented: restricting construction and maintenance activities during sensitive periods; adhering to reasonable speed limits in construction areas; and closing or rehabilitating new or improved access that is not required for maintenance.

Transmission structures could serve as perch, roosting and nesting sites for some avian species (i.e., raptors and corvids), especially in open areas where natural substrates do not currently exist (APLIC 2006; Knight et al. 1995; Steenhof et al. 1993). The presence of additional perch sites could negatively impact nearby prey species such as small mammals and avian species. Construction of Route Segment 1a would require an estimated 40 structures in a landscape dominated by low growing grasses and shrubs. Approximately 18 of the new structures would not be located within 0.25 mile of an existing transmission line (Table 4.3-5).

Injury and mortality to birds could occur through collision with the transmission line. The Project operator has Bird Management Program Guidelines which include documenting mortalities and actions to be taken to reduce mortalities in warranted locations (PacifiCorp 2006). In addition, closing new or improved access roads not required for maintenance would reduce disturbance following construction by limiting human accessibility to OHVs and other motorized vehicles.

Project design features described above are anticipated to be effective at minimizing impacts from direct mortality, noise and human presence, increased perching and roosting sites, and collision with the transmission line. For Route Segment 1a, the scale of biological change and biological disturbance to general wildlife species and their habitat is anticipated to be insignificant or minor and impacts levels are expected to be low.

Special Status Species
Although not documented along Route Segment 1a, suitable habitat is present for side-blotched lizard, black-throated sparrow, cedar waxwing, gray flycatcher, loggerhead shrike, Oregon vesper sparrow, sage sparrow, sage thrasher, long-billed curlew, black-tailed jackrabbit, white-tailed jackrabbit, Cascade red fox, Merriam's shrew, Preble's shrew, and Townsend's ground squirrels. Suitable habitat may be present for Barry's hairstreak; confined to developed areas where ornamental junipers are present. If these species are present, minor impacts might occur from disturbance or displacement, injury or mortality from vehicle strikes and collision with the transmission line, and direct habitat loss or degradation. Project design features described above for general wildlife are also anticipated to be effective at minimizing impacts to special status species that may occur in the Project area. For Route Segment 1a, the scale of biological change and biological disturbance to special status wildlife species is anticipated to be insignificant or minor and impacts levels are expected to be low.

Fish Resources
Upper Yakima spring Chinook, upper Yakima summer steelhead, Yakima bright fall Chinook and Yakima bull trout/Dolly Varden occur in the Yakima River, to the west of Route Segment 1a. No construction would occur and no Project features would be located in or near the Yakima River or adjacent wetlands. In addition, indirect impacts to special status fish resources would be eliminated through the implementation of project design features; no identifiable impacts to special status fish

resources or their habitat are anticipated to occur through construction, operation and maintenance of Route Segment 1a.

Greater Sage-Grouse

The majority of short-term (9.7 acres) habitat disturbance and all of the long-term (1.8 acres) disturbance associated with Route Segment 1a is within the Regularly Occupied Habitat (Tier 1) unit for greater sage-grouse (Tables 4.3-6 and 4.3-7). The Tier 1 Habitat present in the Project area consists of approximately 416,031 acres. Construction activities would disturb approximately 0.3 percent of Tier 1 Habitat on a short-term basis and <0.1 percent on a long-term basis (Tables 4.3-6 and 4.3-7). Breeding, late brood rearing and winter habitat was identified as suitable for 0.8 mile and unsuitable for 1.4 miles. The majority of both long-term and short-term disturbance for this route segment would occur in habitat that has been disturbed in the past and is currently dominated by exotic annual grasses (0.9 acre and 5.3 acres respectively; Tables 4.3-3 and 4.3-4). The remaining long-term disturbance would occur to: 0.4 acre of sagebrush/perennial grassland, <1 percent of sagebrush/perennial grassland present within the Project area; and 0.4 acre of developed and agricultural areas. Project design features implemented during construction and operation are anticipated to be effective at reducing the scale of biological change to sage-grouse habitat (refer to Section 2.5 Project Design Features Common to Action Alternatives). Project design features include: maintaining intact vegetation wherever possible; minimizing the blading of native plant communities during construction, consistent with safe construction practices; utilizing overland travel where feasible; reseeding disturbed areas using an Agency approved mixture of native and non-native species or seed for revegetation as detailed in the POD; and developing and incorporating a Noxious Weed and Invasive Plant Management Plan and a Fire Protection and Control Plan into the final POD. Considering the degraded habitat available within Route Segment 1a and the implementation of project design features, the scale of biological change to sage-grouse habitat is anticipated to range from significant to minor and include the following levels: 0.8 mile of moderate and 1.4 miles of low impact levels.

Greater sage-grouse have not been documented within a half-mile of the proposed route and no active or historical leks are known to occur within 0.6, 2.0, or 3.0 miles of the proposed route (Table 4.3-8). Sage-grouse may occur in the area on an infrequent basis, but available habitat and active, inactive, and historical lekking data indicate that sage-grouse are unlikely to lek within or near Route Segment 1a. Potential impacts to lekking sage-grouse would be minimized by the implementation of project design features such as avoiding construction or maintenance activities within 0.6 mile of active leks from February to June and minimize disturbance from construction and development activities, particularly within 0.6 mile of breeding habitat from February through June. With the implementation of project design features, the scale of biological change and biological disturbance to lekking greater sage-grouse with the construction of Route Segment 1a is anticipated to be insignificant or minor and impacts levels are expected to be low.

Raptors

Bald eagle and osprey nests have been documented within one mile of Route Segment 1a. These nests occur near the Yakima River, west of and away from this route segment. Nesting sites are vulnerable to construction disturbances because adult eagles may abandon the nest during periods of high human activity, resulting in egg or nesting mortality and nest failure. Impacts to nesting raptors are anticipated to be minimal because the Yakima River is 0.5 mile away at its closest point to Route Segment 1a; and as there are no additional riparian areas along or near this route segment, no removal of large trees suitable for roosting, perching and nesting would be removed. In addition, the implementation the project design features such as seasonal restrictions and buffers to avoid nesting raptors during construction would limit disturbance to breeding raptors and would further reduce potential impacts. Bald eagle seasonal restrictions are from January through August and include avoiding construction activities within one mile of an active nest. Seasonal restrictions for osprey are from April through August, with a construction avoidance buffer of with 0.5 mile of an active nest. With the implementation of project design features, the scale of biological disturbance to nesting raptors with the construction of Route Segment 1a is anticipated to be insignificant or minor and impacts levels are expected to be low.

Limited suitable habitat is present for burrowing owls and ferruginous hawks. Potential impacts to these species would occur from disturbance during construction activities or from injury or mortality from vehicle strikes or interactions with other equipment used during construction. Additional impacts to burrowing owls could occur from the mechanical disturbance or crushing of burrows. Noise from construction equipment and general construction activities could disturb and displace individuals on a short-term basis with little impact. Long-term impacts would be related to loss of foraging habitat, reduction in preferred habitat for prey species, and disturbance or mortality from vehicle strikes or interactions with other equipment used for maintenance. Project design features would be implemented to reduce short- and long-term impacts to raptors and include: maintaining intact vegetation wherever possible; minimizing the blading of native plant communities during construction, consistent with safe construction practices; utilizing overland travel where feasible; reseeding disturbed areas using an Agency approved mixture of native and non-native species or seed for revegetation as detailed in the POD; and developing and incorporating a Noxious Weed and Invasive Plant Management Plan and a Fire Protection and Control Plan into the final POD. With the implementation of project design features, the scale of biological change and biological disturbance to raptors and their habitats with the construction of Route Segment 1a is anticipated to be insignificant or minor and impacts levels are expected to be low.

Waterfowl
A waterfowl Priority Species Regional Area has been identified for the wetlands associated with the Yakima River, just west of the Pomona Heights Substation. Waterfowl injury and mortality could occur through collision with the transmission line; however, as no suitable habitat for waterfowl is present along this route segment, it is unlikely that waterfowl would utilize this area on a regular basis. If waterfowl mortality is observed along this route segment, the Project Proponent and the appropriate resource agency would evaluate if additional actions are warranted (i.e., installing bird flight diverters or marking static wires; PacifiCorp 2006). The scale of biological change and biological disturbance to waterfowl and their habitat with the construction of Route Segment 1a is anticipated to be insignificant or minor and impacts levels are expected to be low.

4.3.4.2 Route Segment 1b (Agency Preferred Alternative)

Habitat
Fire history records indicate there have been several fires within and near this route segment. Two firebreaks are present within most of the ROW corridor, consisting of bare ground, cheatgrass and Russian thistle. Despite this disturbance, the adjacent habitat is predominantly high quality big sagebrush and stiff sagebrush with abundant native perennial bunchgrasses, low non-native species cover, and a diverse and abundant native forb layer. Route Segment 1b would also require the long-term removal of approximately 0.1 acre of aspen trees. This area is important to wildlife, especially during dry times of the year because riparian habitats are relatively limited in the area. Unless it is identified during Project design that this area could be spanned, removal of riparian vegetation and aspen would constitute a moderate impact level. Short-term loss of approximately 47 acres of habitat would occur through the construction of Route Segment 1b, including: 23.1 acres of big sagebrush/perennial grassland (less than one percent of available big sagebrush/perennial grassland in the Project area); 10.4 acres of perennial grassland (less than one percent present within Project area); 6.7 acres of annual grassland (less than one percent present within Project area); and 4.1 acres of developed land (less than one percent available in Project area). In addition approximately 1.9 acres of rabbitbrush/annual grassland and 0.4 acre of aspen would be disturbed on a long-term basis. Within Route Segment 1b, this disturbance would comprise approximately 12.6 percent of rabbitbrush/annual grassland and 29 percent of aspen within the Project

area (Table 4.3-4). Long-term loss of approximately 11.3 acres of habitat would occur from construction of Route Segment 1b and includes: 5.1 acres of big sagebrush/perennial grassland (less than one percent of available big sagebrush/perennial grassland in the Project area); 3.1 acres of perennial grassland (less than one percent present within Project area); 1.7 acres of annual grassland (less than one percent present within Project area); and 0.7 acre of developed land (less than one percent available in Project area). In addition approximately 0.5 acre of rabbitbrush/annual grassland and 0.1 acre of aspen would be disturbed on a long-term basis. Within Route Segment 1b, this disturbance would comprise approximately three percent of rabbitbrush/annual grassland and seven percent of aspen within the Project area (Table 4.3-5).

As described above for Route Segment 1a, project design features would be implemented to minimize the scale of biological change to wildlife habitat. Project design features include: maintaining intact vegetation wherever possible; minimizing the blading of native plant communities during construction, consistent with safe construction practices; utilizing overland travel where feasible; reseeding disturbed areas using an Agency approved mixture of native and non-native species or seed for revegetation as detailed in the POD; rehabilitating disturbed areas with certified weed-free materials (e.g., seed, borrow material, straw waddles and bale barriers); washing all equipment before entering the Project area and when leaving areas where noxious weeds are present; closing or rehabilitating new or improved access roads that are not required for maintenance; developing and incorporating a fire prevention plan into the POD; and complying with all federal, state and county noxious weed control regulations and guidelines. With the implementation of project design features described above, the scale of biological change to habitat is anticipated to be insignificant to significant; impacts levels to habitat are expected to be low for 6.2 miles and moderate for 6.3 miles (sagebrush/perennial grassland and aspen trees).

General Wildlife
Impacts to wildlife from construction of Route Segment 1b would be similar to those described for Route Segment 1a. Route Segment 1b has few existing perch sites, primarily associated with a small aspen grove. This route segment would create 89 new perch sites in an area dominated by low growing grasses and shrubs. A small number of new perch sites (4) would be located within 0.25 mile of an existing transmission line.

Special Status Species
Although not documented along Route Segment 1b, suitable habitat is present for side-blotched lizard, black-throated sparrow, cedar waxwing, gray flycatcher, loggerhead shrike, Oregon vesper sparrow, sage sparrow, sage thrasher, ferruginous hawk, black-tailed jackrabbit, white-tailed jackrabbit, Cascade red fox, Merriam's shrew, Preble's shrew, and Townsend's ground squirrels. If these species are present, minor impacts might occur from disturbance or displacement, injury or mortality from vehicle strikes and collision with the transmission line, and direct habitat loss or degradation. Project design features described above for Route Segment 1a are also anticipated to be effective at minimizing impacts to special status species that may occur in the Project area. For Route Segment 1b, the scale of biological change and biological disturbance to special status wildlife species is anticipated to be insignificant or minor and impacts levels are expected to be low.

Burrowing Owl
Burrowing owl nests have been documented within one mile of Route Segment 1b. Potential impacts would occur from disturbance during construction activities or from injury or mortality from vehicle strikes or interactions with other equipment used during construction. Additional impacts to burrowing owls could occur from the mechanical disturbance or crushing of burrows. Noise from construction equipment and general construction activities could disturb and displace individuals on a short-term basis with little impact. Long-term impacts would be related to loss of foraging habitat, reduction in preferred habitat for prey species, and disturbance or mortality from vehicle strikes or interactions with other equipment used for maintenance. Project design features would be implemented to reduce short- and

long-term impacts to raptors and include: maintaining intact vegetation wherever possible; minimizing the blading of native plant communities during construction, consistent with safe construction practices; utilizing overland travel where feasible; reseeding disturbed areas using an Agency approved mixture of native and non-native species or seed for revegetation as detailed in POD; and developing and incorporating a Noxious Weed and Invasive Plant Management Plan and a Fire Protection and Control Plan into the final POD. In addition, the implementation seasonal restrictions and buffers to avoid nesting burrowing owls during construction would limit disturbance during breeding and further reduce potential impacts. Burrowing owl seasonal restrictions are from March through August and include avoiding construction activities within 0.25 mile of an active nest. With the implementation of project design features, the scale of biological change and biological disturbance to burrowing owl and their habitat with the construction of Route Segment 1b is anticipated to be insignificant to significant and include the following levels: 3.5 miles of moderate and 9.0 miles of low impacts.

Greater Sage-Grouse

All of short- (46.6 acres) and long-term (11.3 acres) disturbance associated with Route Segment 1b is within the Regularly Occupied Habitat (Tier 1) unit for greater sage-grouse (Tables 4.3-6 and 4.3-7). The Tier 1 Habitat present in the Project area consists of approximately 416,031 acres. Construction activities would disturb approximately 0.3 percent of Tier 1 Habitat on a short-term basis and 0.1 percent on a long-term basis (Tables 4.3-6 and 4.3-7). Route Segment 1b is located within the JBLM YTC boundary. Two firebreaks are present within most of the ROW corridor, consisting of bare ground, cheatgrass and Russian thistle. Despite this disturbance, the adjacent habitat is predominantly high quality big sagebrush and stiff sagebrush with abundant native perennial bunchgrasses, low non-native species cover, and a diverse and abundant native forb layer. Project design features discussed for Route Segment 1a would be implemented to minimize disturbance to native vegetation. Breeding, late brood rearing or winter habitat was identified as suitable for 5.4 miles, marginal for 1.8 miles and unsuitable for 5.3 miles. With the implementation of project design features, the scale of biological change to sage-grouse habitat is anticipated to range from significant to minor and include the following levels: 5.4 miles of moderate and 7.1 miles of low impacts.

No known active or inactive leks occur within 0.6 mile of the route segment. One historic lek has been documented within 0.6 mile of this segment. Approximately 3.9 miles of this route segment is with two miles of two documented leks. Two active/inactive leks have been documented within three miles of the proposed route along 10.5 miles of the segment (Table 4.3-8). JBLM YTC telemetry data (2010) indicates that individual sage-grouse may move outside of the JBLM YTC border, but available habitat and active, inactive, and historical lekking data indicate that sage-grouse are unlikely to lek within or near Route Segment 1b. In addition to project design features to minimize impact to sage-grouse habitat, impacts to sage-grouse leks would be reduced through the implementation of project design features including: the development of a Wildlife Protection Plans which would identify specific measures and could include ROW clearance surveys prior to construction and the use of biological monitors to protect biological resources during construction; and avoiding construction or maintenance activities within 0.6 mile of active leks from February to June and minimizing disturbance from construction and development activities, particularly within 0.6 mile of breeding habitat from February through June. With the implementation of project design features, the scale of biological change and biological disturbance to lekking greater sage-grouse with the construction of Route Segment 1b is anticipated to be between insignificant to significant and impacts levels are expected to include one mile of moderate and 11.5 miles of low impacts levels.

Long-billed Curlew

Route Segment 1b crosses 3.2 miles of long-billed curlew Priority Species Regional Area and additional potential habitat is present. Impacts to long-billed curlew include a reduction and degradation of habitat, disturbance during nesting and brood-rearing periods, increased human activity, introduction and spread of noxious weeds, and injury or mortality due to collision with construction equipment. Project design features that would be implemented include closing access roads not required for maintenance, reseeding disturbed areas, implementing a noxious weed control plan, adherence to reasonable speed limits and employing seasonal restrictions and buffers to avoid nesting long-billed curlews. For Route Segment 1b, the scale of biological change and biological disturbance to long-billed curlew is anticipated to be insignificant to significant and impacts levels are expected to include 3.2 miles of moderate and 9.3 miles of low impacts.

4.3.4.3 Route Segment 1c

Habitat
The majority of the habitat along and immediately adjacent to this Route Segment is highly disturbed and poor quality, and borders agricultural land, roads and residences. Short-term loss of approximately 48 acres of habitat would occur from construction of Route Segment 1c, including: 27.1 acres of annual grassland (less than one percent of annual grasslands with the Project area), 11.3 acres of big sagebrush/perennial grassland (less than one percent present within Project area); 3.7 acres of perennial grassland (less than one percent present); and 4.3 acres of developed land (less than one percent present). Approximately 1.1 acres of rabbitbrush/annual grassland and 0.4 acre of intermittent stream/gully with upland vegetation present would also be disturbed on a short-term basis. This disturbance would comprise approximately 7.3 one percent of rabbitbrush/annual grassland habitat and 2.9 one percent of intermittent stream/gully habitat present within the Project area. Long-term loss of approximately 23.0 acres of habitat would occur from construction of Route Segment 1c, including: 13.6 acres of annual grassland (less than one percent of annual grasslands with the Project area), 5.9 acres of big sagebrush/perennial grassland (less than one percent present within Project area); 2.0 acres of perennial grassland (less than one percent present); and 0.8 acre of developed land (less than one percent present). Approximately 0.6 acre of rabbitbrush/annual grassland and 0.1 acre of intermittent stream/gully with upland vegetation present would also be disturbed on a long-term basis. This disturbance would comprise approximately four percent of rabbitbrush/annual grassland habitat and one percent of intermittent stream/gully habitat present within the Project area.

As described above for Route Segment 1a, project design features would be implemented to minimize the scale of biological change to wildlife habitat and include maintaining intact vegetation wherever possible; minimizing the blading of native plant communities during construction, consistent with safe construction practices; utilizing overland travel where feasible; reseeding disturbed areas using an Agency approved mixture of native and non-native species or seed for revegetation as detailed in the POD; rehabilitating disturbed areas with certified weed-free materials (e.g., seed, borrow material, straw waddles and bale barriers); washing all equipment before entering the Project area and when leaving areas where noxious weeds are present; closing or rehabilitating new or improved access roads that are not required for maintenance; developing and incorporating a fire prevention plan into the POD; and complying with all federal, state and county noxious weed control regulations and guidelines. With the implementation of project design features described above, the scale of biological change to habitat is anticipated to be insignificant to significant; impacts levels to habitat are expected to be low for 9.8 miles and moderate for 3.1 miles (sagebrush/perennial grassland).

General Wildlife
Impacts to wildlife from construction of Route Segment 1c would be similar to those described for Route Segment 1a. Route Segment 1b has few existing perch sites, primarily associated with residential areas. This route segment would require approximately 92 new structures, 88 of which would not be located within 0.25 mile of an existing transmission line (Table 4.3-5).

Special Status Species

Although not documented along Route Segment 1c, limited suitable habitat is present for side-blotched lizard, black-throated sparrow, cedar waxwing, gray flycatcher, loggerhead shrike, Oregon vesper sparrow, sage sparrow, sage thrasher, ferruginous hawk, black-tailed jackrabbit, white-tailed jackrabbit, Cascade red fox, Merriam's shrew, Preble's shrew, and Townsend's ground squirrels. If these species are present, minor impacts might occur from disturbance or displacement, injury or mortality from vehicle strikes and collision with the transmission line, and direct habitat loss or degradation. Project design features described above for Route Segment 1a are also anticipated to be effective at minimizing impacts to special status species that may occur in the Project area. For Route Segment 1c, the scale of biological change and biological disturbance to special status wildlife species is anticipated to be insignificant or minor and impacts levels are expected to be low.

Burrowing Owl

Nesting burrowing owls have been documented within one mile of Route Segment 1c and additional suitable habitat is present. Impacts to burrowing owls would be similar to those described for Route Segment 1b. Project design features would be implemented to reduce short- and long-term impacts to burrowing owl and include: maintaining intact vegetation wherever possible; minimizing the blading of native plant communities during construction, consistent with safe construction practices; utilizing overland travel where feasible; reseeding disturbed areas using an Agency approved mixture of native and non-native species or seed for revegetation as detailed in POD; and developing and incorporating a Noxious Weed and Invasive Plant Management Plan and a Fire Protection and Control Plan into the final POD. In addition, the implementation seasonal restrictions and buffers to avoid nesting burrowing owls during construction would limit disturbance during breeding and further reduce potential impacts. Burrowing owl seasonal restrictions are from March through August and include avoiding construction activities within 0.25 mile of an active nest. With the implementation of project design features, the scale of biological change and biological disturbance to burrowing owl and their habitat with the construction of Route Segment 1c is anticipated to be insignificant to significant and impacts levels are expected to include 3.2 miles of moderate and 9.3 miles of low impacts.

Greater Sage-Grouse

The majority of short- (46.0 acres) and long-term (22.5 acres) disturbance associated with Route Segment 1c is within the Regularly Occupied Habitat (Tier 1) unit for greater sage-grouse, with the remaining short- (1.8 acres) and long-term (0.6 acres) disturbance occurring within the Occasionally Occupied Habitat (Tier 3) unit (Tables 4.3-6 and Table 4.3-7). The Tier 1 Habitat present in the Project area consists of approximately 416,031 acres. Construction activities would disturb approximately 0.3 percent of Tier 1 Habitat on a short-term basis and 0.1 one percent on a long-term basis (Tables 4.3-6 and 4.3-7). Breeding, late brood rearing or winter habitat was identified as suitable for 3.1 miles, marginal for 8.5 miles and unsuitable for 1.3 miles. Impacts to greater sage-grouse are discussed in detail in Section 4.3.3.2 and are similar to those previously described. Route Segment 1c occurs just outside of the JBLM YTC boundary. The majority of the habitat along and immediately adjacent to this Route Segment is highly disturbed and poor quality, and borders agricultural land, roads and residences. With the implementation of project design features to minimize impacts to habitat, the scale of biological change to sage-grouse habitat is anticipated to range from significant to insignificant and includes the following levels: 3.1 miles of moderate and 9.8 miles of low impacts.

No known active, inactive or historic leks occur within 0.6 mile, two leks have been documented within two miles, and two leks have been documented within three miles of the proposed route (Table 4.3-8). JBLM YTC telemetry data (2010) indicates that individual sage-grouse may move outside of the JBLM YTC border, but available habitat and active, inactive, and historical lekking data indicate that sage-grouse are unlikely to lek within or near Route Segment 1c. Impacts to leks would be similar to those described for Route Segment 1b. In addition to Project design features to minimize impact to sage-grouse habitat, impacts to sage-grouse leks would be reduced through the implementation of Project design features including: the development of a Wildlife Protection Plans which would identify specific measures and could include ROW clearance surveys prior to construction and the use of biological monitors to protect biological resources during construction; and avoiding construction or maintenance activities within 0.6 mile of active leks from February to June and minimizing disturbance from construction and development activities, particularly within 0.6 mile of breeding habitat from February through June. With the implementation of project design features, the scale of biological change and biological disturbance to lekking greater sage-grouse with the construction of Route Segment 1c is anticipated to be insignificant or minor and impacts levels are expected to include 12.9 miles of low impact.

Long-billed Curlew

Route Segment 1c crosses 0.1 mile of long-billed curlew Priority Species Regional Area and additional suitable habitat is limited. Impacts to long-billed curlew would be similar to those described for Route Segment 1b. Project design features that would be implemented include closing access roads not required for maintenance, reseeding disturbed areas, implementing a noxious weed control plan, adherence to reasonable speed limits and employing seasonal restrictions and buffers to avoid nesting long-billed curlews. For Route Segment 1c, the scale of biological change and biological disturbance to long-billed curlew is anticipated to range from significant to insignificant and include the following levels: 0.1 mile of moderate and 12.8 miles of low impacts.

4.3.4.4 Route Segment 2a (Agency Preferred Alternative)

Habitat

Habitat along and immediately adjacent to this Route Segment appears to be highly disturbed and of poor quality. Long-term disturbance of approximately 2.1 acres of habitat would occur from the construction of Route Segment 2a, including 1.9 acres of annual grassland and 0.2 acre of perennial grassland. Short-term disturbance would occur to approximately four acres, 3.6 acres of annual grassland and 0.4 acre of perennial grassland. The long- and short-term disturbance of annual and perennial grassland habitat would comprise less than one percent of existing annual and perennial grassland habitat available in the Project area (Tables 4.3-3 and 4.3-4).

As described above for Route Segment 1a, project design features would be implemented to minimize the scale of biological change to wildlife habitat and include maintaining intact vegetation wherever possible; minimizing the blading of native plant communities during construction, consistent with safe construction practices; utilizing overland travel where feasible; reseeding disturbed areas using an Agency approved mixture of native and non-native species or seed for revegetation as detailed in the POD; rehabilitating disturbed areas with certified weed-free materials (e.g., seed, borrow material, straw waddles and bale barriers); washing all equipment before entering the Project area and when leaving areas where noxious weeds are present; closing or rehabilitating new or improved access roads that are not required for maintenance; developing and incorporating a fire prevention plan into the POD; and complying with all federal, state and county noxious weed control regulations and guidelines. With the implementation of project design features described above, the scale of biological change to habitat is anticipated to be insignificant or minor; impacts levels to habitat are expected to be low for the entire route segment.

General Wildlife

Impacts to wildlife from construction of Route Segment 2a would be similar to those described for Route Segment 1a. Route Segment 2a would require seven new structures in an area dominated by low growing vegetation (Table 4.3-5). None of the seven new structures would be located within 0.25 mile of an existing transmission line.

Special Status Species
Although not documented along Route Segment 2a, limited suitable habitat is present for side-blotched lizard, black-throated sparrow, burrowing owl, cedar waxwing, gray flycatcher, loggerhead shrike, Oregon vesper sparrow, sage sparrow, sage thrasher, burrowing owl, ferruginous hawk, long-billed curlew, black-tailed jackrabbit, white-tailed jackrabbit, Cascade red fox, Merriam's shrew, Preble's shrew, and Townsend's ground squirrels. Impacts to these species would be similar to those described in Route Segment 1a. Minor impacts could occur to these species from disturbance or displacement, injury or mortality from vehicle strikes and collision with the transmission line, and direct habitat loss or degradation. Project design features described above for Route Segment 1a are also anticipated to be effective at minimizing impacts to special status species that may occur in the Project area. For Route Segment 2a, the scale of biological change and biological disturbance to special status wildlife species is anticipated to be insignificant or minor and impacts levels are expected to be low for the entire route segment.

Greater Sage-Grouse
The whole of Route Segment 2a is within the Regularly Occupied Habitat (Tier 1) unit for sage-grouse (Tables 4.3-6 and 4.3-7). The Tier 1 Habitat present in the Project area consists of approximately 416,031 acres. Construction activities would disturb approximately four acres (0.1 percent) of Tier 1 Habitat on a short-term basis and 2.1 acres (0.1 percent) on a long-term basis (Tables 4.3-6 and 4.3-7). Breeding, late brood rearing or winter habitat was identified as marginal for 1.0 miles. Impacts to greater sage-grouse are discussed in detail in Section 4.3.3.2 and are similar to those described for Route Segment 1a. With the implementation of project design features described above, the scale of biological change to sage-grouse habitat is anticipated to be insignificant or minor and impact levels are expected to be low for the entire route segment.

No active, inactive or historical leks are known to occur within 0.6 mile, two or three miles of Route Segment 2a (Table 4.3-8). Impacts to leks would be similar to those described for Route Segment 1b. In addition to project design features to minimize impact to sage-grouse habitat, impacts to sage-grouse leks would be reduced through the implementation of project design features including: the development of a Wildlife Protection Plans which would identify specific measures and could include ROW clearance surveys prior to construction and the use of biological monitors to protect biological resources during construction; and avoiding construction or maintenance activities within 0.6 mile of active leks from February to June and minimizing disturbance from construction and development activities, particularly within 0.6 mile of breeding habitat from February through June. With the implementation of project design features, the scale of biological change and biological disturbance to lekking greater sage-grouse with the construction of Route Segment 2a is anticipated to be insignificant or minor and impacts levels are expected to be low for the entire route segment.

4.3.4.5 Route Segment 2b

Habitat
The central and eastern portions of Route Segment 2b are predominately comprised of high quality big sagebrush and stiff sagebrush with abundant native perennial bunchgrasses, low non-native species cover, and a diverse and abundant native forb layer. Although high quality habitat is present, the eastern portion of this route segment has experienced habitat fragmentation in the past, parallels a disturbed fire break and is adjacent to agriculture/cropland. The western part of the route segment is comprised of areas with lower habitat quality dominated by cheatgrass and/or crested wheatgrass. Fire records indicate that several large fires have occurred within and adjacent to this route segment.
Short-term disturbance would occur to approximately 59.6 acres comprised of: 40.3 acres of big sagebrush/perennial grassland (less than one percent available in Project area); 11.7 acres of annual grassland (less than one percent present within Project area); 4.0 acres of developed land (approximately

2.5 percent of developed land in Project area); 2.5 acres of perennial grassland (less than one percent of Project area); and 1.1 acres of intermittent stream/gully (approximately 10 percent of available stream/gully habitat present within Project area). Long-term disturbance to approximately 35.7 acres of habitat would occur from construction of Route Segment 2b, including: 25.5 acres of big sagebrush/perennial grassland (less than one percent present within Project area); 5.7 acres of annual grassland (less than one percent available in Project area); 2.3 acres of developed land (less than one percent present within Project area); 1.6 acres of perennial grassland (less than one percent available within Project area); and 0.7 acre of intermittent stream/gully with upland vegetation present (approximately six percent of intermittent stream/gully habitat available within Project area).

As described above for Route Segment 1a, project design features would be implemented to minimize the scale of biological change to wildlife habitat and include maintaining intact vegetation wherever possible; minimizing the blading of native plant communities during construction, consistent with safe construction practices; utilizing overland travel where feasible; reseeding disturbed areas using an Agency approved mixture of native and non-native species or seed for revegetation as detailed in the POD; rehabilitating disturbed areas with certified weed-free materials (e.g., seed, borrow material, straw waddles and bale barriers); washing all equipment before entering the Project area and when leaving areas where noxious weeds are present; closing or rehabilitating new or improved access roads that are not required for maintenance; developing and incorporating a fire prevention plan into the POD; and complying with all federal, state and county noxious weed control regulations and guidelines. With the implementation of project design features described above, the scale of biological change to habitat is anticipated to be insignificant to significant; impacts levels to habitat are expected to be low for 5.2 miles and moderate for 11.2 miles (sagebrush/perennial grassland).

General Wildlife
Impacts to wildlife from construction of Route Segment 2b would be similar to those described for Route Segment 1a. This route segment would require 116 new structures in an area dominated by low growing grasses and shrubs. None of the 116 new structures would be located within 0.25 mile of an existing transmission line.

Special Status Species
Although not documented along Route Segment 2b, suitable habitat is present for side-blotched lizard, black-throated sparrow, burrowing owl, cedar waxwing, gray flycatcher, loggerhead shrike, Oregon vesper sparrow, sage sparrow, sage thrasher, burrowing owl, ferruginous hawk, long-billed curlew, white-tailed jackrabbit, Cascade red fox, Merriam’s shrew, Preble’s shrew, and Townsend’s ground squirrels. Impacts to these species would be similar to those described in Route Segment 1a. Minor impacts could occur to these species from disturbance or displacement, injury or mortality from vehicle strikes and collision with the transmission line, and direct habitat loss or degradation. Project design features described above for Route Segment 1a are also anticipated to be effective at minimizing impacts to special status species that may occur in the Project area. For Route Segment 2b, the scale of biological change and biological disturbance to special status wildlife species is anticipated to be insignificant or minor and impacts levels are expected to be low for the entire route segment.

Black-Tailed Jackrabbit
Black-tailed jackrabbit have been documented with a half mile of a 1.9 mile section of Route Segment 2b. Impacts to black-tailed jackrabbits include a reduction and degradation of habitat, disturbance and displacement from habitats, increased human activity, introduction and spread of noxious weeds, and injury or mortality due to collision with construction equipment. Project design features such as closing access roads not required for maintenance, reseeding disturbed areas, implementing a noxious weed control plan, and adherence to reasonable speed limits would reduce the scale of biological disturbance and biological change that would occur. For Route Segment 2b, the scale of biological change and

biological disturbance to black-tailed jackrabbit is anticipated to range between insignificant and significant and impacts levels are expected to be low for 14.5 miles and moderate for 1.9 miles.

Greater Sage-Grouse
The whole of Route Segment 2b is within the Regularly Occupied Habitat (Tier 1) unit for sage-grouse (Tables 4.3-6 and 4.3-7). The Tier 1 Habitat present in the Project area consists of approximately 416,031 acres. Construction activities would disturb approximately 59.6 (0.3 percent) of Tier 1 Habitat on a short-term basis and 35.7 acres (0.2 percent) on a long-term basis (Tables 4.3-6 and 4.3-7). Breeding, late brood rearing or winter habitat was identified as suitable for 10.3 miles, marginal for 5.0 miles and unsuitable for 1.1 miles. Impacts to greater sage-grouse are discussed in detail in Section 4.3.3.2 and are similar to those described for Route Segment 1a. Approximately eight miles of this route segment borders JBLM YTC's southern boundary. This segment has been disturbed by an existing firebreak, fence line, agriculture, and road network and was utilized to minimize additional impacts to sage-grouse habitat. With the implementation of project design features described above, the scale of biological change to sage-grouse habitat is anticipated to be insignificant to significant and impact levels are expected to include 10.3 miles of moderate and 6.1 miles of low impacts.

No active, inactive or historical leks are known to occur within 0.6 mile of Route Segment 2b. Two leks has been documented within two and three miles of this route segment (Table 4.3-8). JBLM YTC telemetry data (2010) indicates that individual sage-grouse may move outside of the JBLM YTC border, but available habitat and active, inactive, and historical lekking data indicate that sage-grouse are unlikely to lek within or near Route Segment 2b. Impacts to leks would be similar to those described for Route Segment 1b. In addition to project design features to minimize impact to sage-grouse habitat, impacts to sage-grouse leks would be reduced through the implementation of project design features including: the development of a Wildlife Protection Plans which would identify specific measures and could include ROW clearance surveys prior to construction and the use of biological monitors to protect biological resources during construction; and avoiding construction or maintenance activities within 0.6 mile of active leks from February to June and minimizing disturbance from construction and development activities, particularly within 0.6 mile of breeding habitat from February through June. With the implementation of project design features, the scale of biological change and biological disturbance to lekking greater sage-grouse with the construction of Route Segment 2b is anticipated to be insignificant or minor and impacts levels are expected to be low for the entire route segment.

4.3.4.6 Route Segment 2c (Agency Preferred Alternative)

Habitat
Habitat along this Route Segment has been fragmented and disturbed by roads, developed land, agricultural/cropland and annual grass establishment. The eastern portion of this route segment parallels two existing transmission lines for approximately 8.5 miles. Fire records indicate that several fires have occurred within and adjacent to this route segment. Short-term disturbance would occur to approximately 66.1 acres comprised of: 27.2 acres of developed land; 21/7 acres of annual grassland; 16.8 acres of sagebrush/perennial grassland; and 0.4 acre of perennial grassland. Long-term disturbance to approximately 22.7 acres of habitat would occur from construction of Route Segment 2c, including 9.4 acres of annual grassland, 8.0 acres of sagebrush/perennial grassland, 5.2 acres of developed land, and 0.1 acre of perennial grassland. The short- and long-term disturbance would disturb less than one percent of the Project area for annual grassland, sagebrush/perennial grassland, developed land, and perennial grassland (Tables 4.3-3 and 4.3-4).

As described above for Route Segment 1a, project design features would be implemented to minimize the scale of biological change to wildlife. With the implementation of project design features described above, the scale of biological change to habitat is anticipated to be insignificant to significant; impacts levels to habitat are expected to be low for 13.5 miles and moderate for 4.6 miles (sagebrush/perennial grassland).

General Wildlife
Impacts to wildlife from construction of Route Segment 2c would be similar to those described for Route Segment 1a. Two existing transmission lines are paralleled for approximately 8.5 miles and currently provide perching opportunities for raptors and corvids. Approximately 9.6 miles of the route segment has limited perching sites currently available and an estimated 124 new structures would be added (Table 4.3-5). Approximately 60 new structures would not be located within 0.25 mile of an existing transmission line.

Special Status Species
Although not documented along Route Segment 2c, limited suitable habitat is present for side-blotched lizard, black-throated sparrow, cedar waxwing, gray flycatcher, loggerhead shrike, Oregon vesper sparrow, sage sparrow, sage thrasher, ferruginous hawk, black-tailed jackrabbit, white-tailed jackrabbit, Cascade red fox, Merriam’s shrew, Preble’s shrew, and Townsend’s ground squirrels. Impacts to these species would be similar to those described in Route Segment 1a. Minor impacts could occur to these species from disturbance or displacement, injury or mortality from vehicle strikes and collision with the transmission line, and direct habitat loss or degradation. Project design features described above for Route Segment 1a are also anticipated to be effective at minimizing impacts to special status species that may occur in the Project area. For Route Segment 2c, the scale of biological change and biological disturbance to special status wildlife species is anticipated to be insignificant or minor and impacts levels are expected to be low for the entire route segment.

Burrowing Owls
Burrowing owl nests have been documented within one mile of approximately 5.3 miles of Route Segment 2c. Limited suitable habitat is present within this route segment. Impacts to burrowing owls would be similar to those described for Route Segment 1b. Project design features would be implemented to reduce short- and long-term impacts to burrowing owl and include: maintaining intact vegetation wherever possible; minimizing the blading of native plant communities during construction, consistent with safe construction practices; utilizing overland travel where feasible; reseeding disturbed areas using an Agency approved mixture of native and non-native species or seed for revegetation as detailed in POD; and developing and incorporating a Noxious Weed and Invasive Plant Management Plan and a Fire Protection and Control Plan into the final POD. In addition, the implementation seasonal restrictions and buffers to avoid nesting burrowing owls during construction would limit disturbance during breeding and further reduce potential impacts. Burrowing owl seasonal restrictions are from March through August and include avoiding construction activities within 0.25 mile of an active nest. With the implementation of project design features, the scale of biological change and biological disturbance to burrowing owl and their habitat with the construction of Route Segment 2c is anticipated to be insignificant to significant and impacts levels are expected to include 5.3 miles of moderate and 12.8 miles of low impacts.

Greater Sage-Grouse
The majority of short- (60.7 acres) and long-term (21.6 acres) disturbance associated with the construction of Route Segment 2c is within the Regularly Occupied Habitat (Tier 1) unit for sage-grouse, with the remaining short- (5.4 acres) and long-term (1.1 acres) disturbance occurring within the Occasionally Occupied Habitat (Tier 3) unit (Table 4.3-6 and 4.3-7). The Tier 1 Habitat present in the Project area consists of approximately 416,031 acres and the Tier 3 Habitat is approximately 6,300 acres in size. Construction activities would disturb approximately 0.3 percent of Tier 1 Habitat on a short-term basis and <0.1 percent on a long-term basis (Tables 4.3-6 and 4.3-7). Breeding, late brood rearing or winter habitat was identified as suitable for 4.5 miles, marginal for 6.0 miles and unsuitable for 7.6 miles. Impacts to greater sage-grouse are discussed in detail in Section 4.3.3.2 and are similar to those described

for Route Segment 1a. Route Segment 2c would be within an existing power line corridor that accommodates the Union Gap-Midway 230 kV and Midway-Moxee 115 kV lines for approximately nine miles. In addition, 7.6 miles of this route segment crosses land disturbed by agriculture and grazing. These existing disturbed areas were utilized to minimize disturbance habitat. With the implementation of project design features described above, the scale of biological change to sage-grouse habitat is anticipated to be insignificant to significant and impact levels are expected to include 4.5 miles of moderate and 13.6 miles of low impacts.

No active, inactive or historical leks are known to occur within 0.6 mile and two miles of Route Segment 2c. Two leks has been documented within three miles of this route segment (Table 4.3-8). JBLM YTC telemetry data (2010) indicates that individual sage-grouse may move outside of the JBLM YTC border, but available habitat and active, inactive, and historical lekking data indicate that sage-grouse are unlikely to lek within or near Route Segment 2c. Impacts to leks would be similar to those described for Route Segment 1b. In addition to Project design features to minimize impact to sage-grouse habitat, impacts to sage-grouse leks would be reduced through the implementation of project design features including: the development of a Wildlife Protection Plans which would identify specific measures and could include ROW clearance surveys prior to construction and the use of biological monitors to protect biological resources during construction; and avoiding construction or maintenance activities within 0.6 mile of active leks from February to June and minimizing disturbance from construction and development activities, particularly within 0.6 mile of breeding habitat from February through June. With the implementation of project design features, the scale of biological change and biological disturbance to lekking greater sage-grouse with the construction of Route Segment 2b is anticipated to be insignificant or minor and impacts levels are expected to be low for the entire route segment.

Long-billed Curlew
A long-billed curlew nesting area has been documented within one mile of a 0.8 mile section of Route Segment 2c. Additional suitable habitat is present. Impacts to long-billed curlew would be similar to those described for Route Segment 1b. Project design features that would be implemented include closing access roads not required for maintenance, reseeding disturbed areas, implementing a noxious weed control plan, adherence to reasonable speed limits and employing seasonal restrictions and buffers to avoid nesting long-billed curlews. For Route Segment 2c, the scale of biological change and biological disturbance to long-billed curlew is anticipated to range from significant to insignificant and include the following levels: 0.8 mile of moderate and 17.3 miles of low impacts.

4.3.4.7 Route Segment 2d (Agency Preferred Alternative)

Habitat
The entire extent of this route segment has experienced several burn events and the adjacent landscape has large areas dominated by annual grasses and forbs, primarily cheatgrass and tall tumblemustard; however pockets of big sagebrush and forbs are present. Short-term disturbance would occur to approximately 26.5 acres and is comprised of: 21.3 acres of sagebrush/perennial grassland (less than one percent of available sagebrush/perennial grassland present within Project area); 2.6 acres of annual grassland (approximately four percent of annual grassland within Project area); and 2.6 acres of perennial grassland (less than one percent of available habitat within Project area). Long-term loss of approximately 15.3 acres of habitat would occur from construction of Route Segment 2d, including 12.7 acres (less than one percent available) of sagebrush/perennial grassland, 1.4 acres (approximately two percent of available habitat) of annual grassland and 1.2 acres (seven percent) of perennial grassland (Tables 4.3-3 and 4.3-4).

As described above for Route Segment 1a, project design features would be implemented to minimize the scale of biological change to wildlife. With the implementation of project design features described above, the scale of biological change to habitat is anticipated to be insignificant to significant; impacts levels to habitat are expected to be low for 1.9 miles and moderate for 5.1 miles (sagebrush/perennial grassland).

General Wildlife

Impacts to wildlife from construction of Route Segment 2d would be similar to those described for Route Segment 1a. Route Segment 2d has few existing perch sites, primarily associated with residential areas. This route segment would require 50 new structures in an area dominated by low growing grasses and shrubs. None of the 50 new structures would be located within 0.25 mile of an existing transmission line (Table 4.3-5).

Special Status Species

Although not documented along Route Segment 2d, suitable habitat is present for burrowing owls, side-blotched lizard, black-throated sparrow, cedar waxwing, gray flycatcher, Oregon vesper sparrow, sage sparrow, sage thrasher, black-tailed jackrabbit, white-tailed jackrabbit, Cascade red fox, Merriam's shrew, Preble's shrew, and Townsend's ground squirrels. Habitat for pallid, spotted and Townsend's big eared bat, bald eagle, peregrine falcons, striped whipsnake and nightsnake is present in the basalt cliffs and rock outcrops located near where Route Segment 2d meets the Columbia River corridor. It is anticipated that helicopters would assist in the construction the transmission line structures in steep terrain. Minor impacts could occur to these species from disturbance or displacement, injury or mortality from vehicle strikes and collision with the transmission line, and direct habitat loss or degradation. Project design features described above for Route Segment 1a are also anticipated to be effective at minimizing impacts to special status species that may occur in the Project area. For Route Segment 2d, the scale of biological change and biological disturbance to special status wildlife species is anticipated to be insignificant or minor and impacts levels are expected to be low for the entire route segment.

Chukar

Route Segment 2d crosses 0.9 mile of chukar Priority Species Regional Area and additional suitable habitat is present. This area is primarily a dry rocky slope dominated by cheatgrass. Impacts include disturbance or displacement, injury or mortality from vehicle strikes and equipment, and direct habitat loss or degradation. Noise from construction equipment, helicopters, and general construction activities could disturb and displace chukar on a short-term basis. In addition, the transmission poles would serve as perch sites for raptor species, which could prey on chukar. The implementation of project design features are anticipated to reduce impacts to chukar, and include: closing access roads not required for maintenance, reseeding disturbed areas, implementing a noxious weed control plan, and adherence to reasonable speed limits. For Route Segment 2d, the scale of biological change and biological disturbance to chukar is anticipated to include 0.9 mile of moderate and 6.1 miles of low impacts.

Greater Sage-Grouse

The whole of Route Segment 2d is within the Regularly Occupied Habitat (Tier 1) unit for sage-grouse (Tables 4.3-6 and 4.3-7). The Tier 1 Habitat present in the Project area consists of approximately 416,031 acres. Construction activities would disturb approximately 26.5 (0.3 percent) of Tier 1 Habitat on a short-term basis and 15.3 acres (0.2 percent) on a long-term basis (Tables 4.3-6 and 4.3-7). Breeding, late brood rearing or winter habitat was identified as suitable for 5.8 miles and marginal for 1.2 mile. Impacts to greater sage-grouse are discussed in detail in Section 4.3.3.2 and are similar to those described for Route Segment 1a. With the implementation of project design features described above, the scale of biological change to sage-grouse habitat is anticipated to be insignificant to significant and impact levels are expected to include 5.8 miles of moderate and 1.2 mile of low impacts.

No active, inactive or historical leks are known to occur within 0.6 mile and two miles of Route Segment 2d. One lek has been documented within three miles of this route segment (Table 4.3-8). Impacts to leks would be similar to those described for Route Segment 1b. In addition to Project design features to minimize impact to sage-grouse habitat, impacts to sage-grouse leks would be reduced through the implementation of Project design features including: the development of a Wildlife Protection Plans which would identify specific measures and could include ROW clearance surveys prior to construction and the use of biological monitors to protect biological resources during construction; and avoiding construction or maintenance activities within 0.6 mile of active leks from February to June and minimizing disturbance from construction and development activities, particularly within 0.6 mile of breeding habitat from February through June. With the implementation of project design features, the scale of biological change and biological disturbance to lekking greater sage-grouse with the construction of Route Segment 2d is anticipated to be insignificant or minor and impacts levels are expected to be low for the entire route segment.

Loggerhead Shrike

Loggerhead shrike individuals have been observed within a half mile of a 2.0 mile section of Route Segment 2d. Impacts loggerhead shrike include a reduction and degradation of habitat, disturbance during nesting and brood-rearing periods, increased human activity, introduction and spread of noxious weeds, and injury or mortality due to collision with construction equipment. The implementation of project design features would reduce the scale of biological disturbance and biological change. Project design features include closing access roads not required for maintenance, reseeding disturbed areas, implementing a noxious weed control plan, adherence to reasonable speed limits and employing seasonal restrictions and buffers to avoid nesting loggerhead. For Route Segment 2d, the scale of biological change and biological disturbance to loggerhead shrike is anticipated to range from significant to insignificant and include the following levels: 2.0 miles of moderate and 5.0 miles of low impacts.

Raptors

Route Segment 2d is located within one mile of ferruginous hawk nests for 2.3 miles of the route and within one mile of prairie falcon nests for an additional 2.2 miles. Impacts to raptors would be similar to those described for Route Segment 1a. Project design features would be implemented to reduce short- and long-term impacts and include: maintaining intact vegetation wherever possible; minimizing the blading of native plant communities during construction, consistent with safe construction practices; utilizing overland travel where feasible; reseeding disturbed areas using an Agency approved mixture of native and non-native species or seed for revegetation as detailed in POD; and developing and incorporating a Noxious Weed and Invasive Plant Management Plan and a Fire Protection and Control Plan into the final POD. In addition, the implementation seasonal restrictions and buffers to avoid nesting raptors during construction would limit disturbance during breeding and further reduce potential impacts. Ferruginous hawk seasonal restrictions are from March through July and include avoiding construction activities within 0.5 mile of an active nest. Seasonal restrictions for prairie falcon would be from April through August and would include avoiding construction activities within 0.25 mile of an active nest. With the implementation of project design features, the scale of biological change and biological disturbance to nesting raptors and their habitat is anticipated to be insignificant to significant and impacts levels are expected to include 4.5 miles of moderate and 2.5 miles of low impacts.

4.3.4.8 Route Segment 3a (Agency Preferred Alternative)

Habitat

Short- and long-term disturbance would occur entirely in sagebrush/perennial grassland habitat, including 1.1 acres of short-term and 0.1 acre long-term disturbance. Both short- and long-term disturbance would disturb less than one percent of available sagebrush/perennial grassland within the Project area (Tables 4.3-3 and 4.3-4). Project design features designed to minimize impacts to habitat would be similar to those described for general habitat and Route Segment 1a. The scale of biological change to habitat is anticipated to be insignificant or minor, with low impact levels expected for the entire route segment.

General Wildlife
Impacts to wildlife from construction of Route Segment 3a would be similar to those described for Route Segment 1a. Route Segment 3a is a short route segment that would require three new transmission structures, all of which would be located with 0.25 mile of an existing transmission line (Table 4.3-5).

Special Status Species
Although not documented along Route Segment 3a, suitable habitat is present for side-blotched lizard, black-throated sparrow, cedar waxwing, gray flycatcher, loggerhead shrike, Oregon vesper sparrow, sage sparrow, sage thrasher, ferruginous hawk, white-tailed jackrabbit, Cascade red fox, Merriam's shrew, Preble's shrew, and Townsend's ground squirrels. Impacts to these species would be similar to those described in Route Segment 1a. Project design features described above for Route Segment 1a are also anticipated to be effective at minimizing impacts to special status species that may occur in the Project area. For Route Segment 3a, the scale of biological change and biological disturbance to special status wildlife species is anticipated to be insignificant or minor and impacts levels are expected to be low for the entire route segment.

Amphibians and Reptiles
Sagebrush lizard, striped whipsnake, and nightsnake have been observed within a half mile of this short route segment. Impacts to these species could occur from biological disturbance, including injury or mortality from vehicle strikes and equipment and increased predation, and biological change through direct habitat loss or degradation. Project design features described above for Route Segment 1a are also anticipated to be effective at minimizing impacts to amphibians and reptiles. Project design features include the following: restricting construction and maintenance activities during sensitive periods; adhering to reasonable speed limits in construction areas; and closing or rehabilitating new or improved access that is not required for maintenance. For Route Segment 3a, construction and operation is anticipated to cause some biological change or biological disturbance, ranging between significant to insignificant and the impact level is expected to be 0.1 mile of moderate impacts.

Black-tailed Jackrabbit
Black-tailed jackrabbits have been observed within a half mile of this short route segment. Impacts to black-tailed jackrabbits would be similar to those described for Route Segment 2b. Project design features such as closing access roads not required for maintenance, reseeding disturbed areas, implementing a noxious weed control plan, and adherence to reasonable speed limits would reduce the scale of biological disturbance and biological change that would occur. For Route Segment 2a, the scale of biological change and biological disturbance to black-tailed jackrabbit is anticipated to range between insignificant and significant and impacts levels are expected to be moderate for 0.1 mile.

Greater Sage-Grouse
Approximately half of Route Segment 3a is within the Occasionally Occupied Habitat (Tier 3) unit for sage-grouse, with the remaining portion of this route segment outside of designated sage-grouse priority habitat. The Tier 3 Habitat present in the Project area consists of approximately 2,194 acres. Construction activities would disturb approximately 0.5 acre (<0.1 percent) of Tier 3 Habitat on a short-term basis and 0.1 acre (<0.1 percent) on a long-term basis (Tables 4.3-6 and 4.3-7). Breeding, late brood rearing or winter habitat was identified as marginal for 0.1 mile. Impacts to greater sage-grouse are discussed in detail in Section 4.3.3.2 and are similar to those described for Route Segment 1a. With the implementation of project design features described above, the scale of biological change to sage-grouse habitat is anticipated to range between insignificant and significant and are expected to be 0.1 mile of low impacts.

No active, inactive or historical leks are known to occur within 0.6, two, or three miles of Route Segment 3a (Table 4.3-8). In addition to project design features to minimize impact to sage-grouse habitat, impacts to sage-grouse leks would be reduced through the implementation of Project design features including: the development of a Wildlife Protection Plans which would identify specific measures and could include ROW clearance surveys prior to construction and the use of biological monitors to protect biological resources during construction; and avoiding construction or maintenance activities within 0.6 mile of active leks from February to June and minimizing disturbance from construction and development activities, particularly within 0.6 mile of breeding habitat from February through June. With the implementation of project design features, the scale of biological change and biological disturbance to lekking greater sage-grouse with the construction of Route Segment 3a is anticipated to be insignificant or minor and impacts levels are expected to be low for the entire route segment.

Mule Deer
A mule deer Priority Species Regional Area is located in a wetland adjacent to the Vantage Substation. Although not crossed by Route Segment 3a, short-term displacement and disturbance could occur through construction activity and noise. Since the wetland is adjacent to a disturbed area (substation and existing transmission lines) and the wetland extends away from the route segment, impacts to mule deer are anticipated to be low.

4.3.4.9 Route Segment 3b

Habitat
The majority of disturbance for this route segment would occur on developed land, primarily occurring within an abandoned railroad ROW. The remaining part of Route Segment 3b is a mixture of high quality sagebrush with a diverse forb layer, sagebrush adjacent to agriculture, a watered poplar wind row, basalt cliffs, and a seasonally moist alkaline swale habitat resulting from cliff runoff. Fire history records indicate that large portions of Route Segment 3b have burned since the late 1980s. Short-term disturbance would occur to approximately 77 acres and is comprised of: 44.4 acres of disturbed/developed land (less than one percent of available land); 19.2 acres of sagebrush/perennial grassland (less than one percent of available sagebrush/perennial grassland present within Project area); 5.9 acres of trees (approximately 28 percent of available habitat within Project area); 2.5 acres of perennial grassland (less than one percent of available habitat within Project area); 1.9 acres of annual grassland (less than one percent of available); 1.7 acres of rabbitbrush/annual grassland (approximately 19.1 percent of available rabbitbrush annual grassland habitat within Project area); 0.4 acre of sagebrush/annual grassland (6.8 percent of sagebrush/annual grassland habitat within Project area); 0.7 acre of riparian (less than one percent available within Project area); and 0.3 acre of basalt cliffs/rock (approximately 1.5 percent of Project area). Long-term disturbance to approximately 30.9 acres of habitat would occur from construction of Route Segment 3b and is comprised of: 21.8 acres of disturbed/developed land (less than one percent of available land); 6.1 acres of sagebrush/perennial grassland (less than one percent of available sagebrush/perennial grassland present within Project area); 1.2 acres of trees (approximately six percent of available habitat within Project area); 0.7 acre of perennial grassland (less than one percent of available habitat within Project area); 0.4 acre of annual grassland (less than one percent of available); 0.3 acre of rabbitbrush/annual grassland (approximately three percent of available rabbitbrush annual grassland habitat within Project area); 0.1 acre of sagebrush/annual grassland (approximately two one percent of sagebrush/annual grassland habitat within Project area); 0.4 acre of riparian (less than one percent available within Project area); and 0.2 acre of basalt cliffs/rock (approximately one percent of Project area; Tables 4.3-3 and 4.3-4).

As described above for Route Segment 1a, project design features would be implemented to minimize the scale of biological change to wildlife. With the implementation of project design features described above, the scale of biological change to habitat is anticipated to range between insignificant and significant; impacts levels to habitat are expected to be low for 14.6 miles and moderate for 7.1 miles (sagebrush/perennial grassland).

General Wildlife

Impacts to general wildlife from construction of Route Segment 3b would be similar to those described for Route Segment 1a. Trees along the Columbia River, a watered poplar wind row, and basalt cliffs provide existing perch sites for raptors and corvids and Route Segment 3b would add an additional 181 structures (Table 4.3-5). The majority of these structures (160) would be located more than 0.25 mile from an existing transmission line.

Special Status Species

Although not documented along Route Segment 3b, suitable habitat is present for side-blotched lizard, black-throated sparrow, cedar waxwing, gray flycatcher, loggerhead shrike, Oregon vesper sparrow, sage sparrow, sage thrasher, ferruginous hawk, black-tailed jackrabbit, white-tailed jackrabbit, Cascade red fox, Merriam's shrew, Preble's shrew, and Townsend's ground squirrels. Impacts to these species would be similar to those described in Route Segment 1a. Project design features described above for Route Segment 1a are also anticipated to be effective at minimizing impacts to special status species that may occur in the Project area. For Route Segment 3b, the scale of biological change and biological disturbance to special status wildlife species is anticipated to be insignificant or minor and impacts levels are expected to be low for the entire route segment.

Amphibians and Reptiles

Sagebrush lizard, striped whipsnake and nightsnake have been documented within a half mile of the northern end of Route Segment 3b. Impacts to these species would be similar to those described for Route Segment 3a. Impacts to these species could occur from biological disturbance, including injury or mortality from vehicle strikes and equipment and increased predation, and biological change through direct habitat loss or degradation. Project design features described above for Route Segment 1a are also anticipated to be effective at minimizing impacts to amphibians and reptiles. Project design features include the following: restricting construction and maintenance activities during sensitive periods; adhering to reasonable speed limits in construction areas; and closing or rehabilitating new or improved access that is not required for maintenance. For Route Segment 3b, construction and operation is anticipated to cause some biological change or biological disturbance, ranging between significant to insignificant and impact levels are expected to be 6.8 miles of moderate and 14.9 miles of low impacts.

Black-tailed Jackrabbit

Black-tailed jackrabbits have been documented with a half mile of 3.4 miles of Route Segment 3b. Impacts to black-tailed jackrabbits would be similar to those described for Route Segment 2b. Project design features such as closing access roads not required for maintenance, reseeding disturbed areas, implementing a noxious weed control plan, and adherence to reasonable speed limits would reduce the scale of biological disturbance and biological change that would occur. For Route Segment 3b, the scale of biological change and biological disturbance to black-tailed jackrabbit is anticipated to range between insignificant and significant and impacts levels are expected to be moderate for 3.4 miles and low for 8.3 miles.

Chukar

Route Segment 3b crosses 2.9 miles of chukar Priority Species Regional Area. The majority of this area occurs away from this route segment, along draws created by intermittent streams on JBLM YTC property. Impacts to chukar include disturbance or displacement, injury or mortality from vehicle strikes and equipment, and direct habitat loss or degradation. Noise from construction equipment and general construction activities could disturb and displace chukar on a short-term basis. In addition, the transmission poles would serve as perch sites for raptor species, which could prey on chukar. The implementation of project design features are anticipated to reduce impacts to chukar, and include: closing access roads not required for maintenance, reseeding disturbed areas, implementing a noxious weed control plan, and adherence to reasonable speed limits. For Route Segment 3b, the scale of biological change and biological disturbance to chukar is anticipated to range between insignificant and significant and include 2.9 miles of moderate and 18.8 miles of low impacts.

Chinook Salmon

The Hanford Reach supports the larger of the only two remaining healthy naturally spawning fall Chinook salmon populations in the Columbia River System (Nugent et al. 2002). Route Segment 3b parallels the Hanford Reach for 2.7 miles to the Priest Rapids Dam. No structure or road construction work would occur within the Columbia River. For the Columbia River crossing the structures would be approximately 200 foot tall lattice steel structures for the up to 2,800 foot crossing. Impacts to Chinook salmon from the construction of Route Segment 3b could include increased erosion, sedimentation and elevated turbidity. The potential for impacts would be minimized by implementing project design features that apply and maintain standard erosion and sediment control methods. Specific erosion and sediment control measures and locations would be specified in the SWPPP. These may include straw waddles, straw bale barriers and silt fencing which would be placed at construction boundaries. For Route Segment 3b, the scale of biological change and biological disturbance to Chinook salmon is anticipated to be insignificant or minor and impacts levels are expected to be low for the entire route segment.

Greater Sage-Grouse

The majority of short- (54.1 acres) and long-term (22.5 acres) disturbance associated with the construction of Route Segment 3b is within the Regularly Occupied Habitat (Tier 1) unit for sage-grouse, with the remaining short- (14.8 acres) and long-term (5.4 acres) disturbance occurring within the Occasionally Occupied Habitat (Tier 3) unit (Table 4.3-6 and 4.3-7). The Tier 1 Habitat present in the Project area consists of approximately 416,031 acres and the Tier 3 Habitat is approximately 6,300 acres in size. Construction activities would disturb approximately 0.3 percent of Tier 1 Habitat on a short-term basis and 0.1 percent on a long-term basis (Tables 4.3-6 and 4.3-7). Breeding, late brood rearing or winter habitat was identified as suitable for 8.2 miles, marginal for 1.1 miles and unsuitable for 12.4 miles. Impacts to greater sage-grouse are discussed in detail in Section 4.3.3.2 and are similar to those described for Route Segment 1a. Route Segment 3b follows JBLM YTC's eastern boundary. The majority of disturbance for this route segment would occur on developed land, primarily within an abandoned railroad ROW. Existing disturbed areas were utilized to minimize disturbance to habitat. Impacts to greater sage-grouse are discussed in detail in Section 4.3.3.2 and are similar to those described for Route Segment 1a. With the implementation of project design features described above, the scale of biological change to sage-grouse habitat is anticipated to range between insignificant and significant and are expected to include 8.2 miles of moderate and 13.5 miles of low impacts.

No active, inactive or historical leks are known to occur within 0.6 mile of Route Segment 3b. One lek has been documented within two and three miles of this route segment (Table 4.3-8). In addition to project design features to minimize impact to sage-grouse habitat, impacts to sage-grouse leks would be reduced through the implementation of project design features including: the development of a Wildlife Protection Plans which would identify specific measures and could include ROW clearance surveys prior to construction and the use of biological monitors to protect biological resources during construction; and avoiding construction or maintenance activities within 0.6 mile of active leks from February to June and minimizing disturbance from construction and development activities, particularly within 0.6 mile of breeding habitat from February through June. With the implementation of project design features, the scale of biological change and biological disturbance to lekking greater sage-grouse with the construction of Route Segment 3b is anticipated to be insignificant or minor and impacts levels are expected to be low for the entire route segment.

Loggerhead Shrike
Loggerhead shrike nests have been observed within one mile of the route segment, most likely within shrubs associated with the Hanson Creek drainage. These observations occur along a two mile section of Route Segment 3b. Impacts to loggerhead shrike would be similar to those described for Route Segment 2d and include a reduction and degradation of habitat, disturbance during nesting and brood-rearing periods, increased human activity, introduction and spread of noxious weeds, and injury or mortality due to collision with construction equipment. The implementation of project design features would reduce the scale of biological disturbance and biological change. Project design features include closing access roads not required for maintenance, reseeding disturbed areas, implementing a noxious weed control plan, adherence to reasonable speed limits and employing seasonal restrictions and buffers to avoid nesting loggerhead. For Route Segment 3b, the scale of biological change and biological disturbance to loggerhead shrike is anticipated to range from significant to insignificant and would include 1.0 mile of moderate impacts.

Mule Deer
Route Segment 3b crosses 7.9 miles of mule deer Priority Species Regional Area. Mule deer have been observed in this area utilizing uplands and riparian habitat for forage, water, and cover. Impacts to mule deer include biological disturbance, including injury or mortality from vehicle and equipment, noise from construction activities, and biological change such as habitat loss and degradation. Noise from construction equipment and general construction activities could disturb and displace mule deer on a short-term basis; however abundant habitat is available west into JBLM YTC property. The implementation of project design features are anticipated to be effective at reducing impacts to mule deer and include closing access roads not required for maintenance, reseeding disturbed areas, implementing a noxious weed control plan, and adhering to reasonable speed limits With the implementation of project design features, the scale of biological change and biological disturbance to mule deer associated with the construction of Route Segment 3b is anticipated to be insignificant or minor and impacts levels are expected to be low for the entire route segment.

Raptors
Route Segment 3b has the highest number of nests within one mile of the route segment. These include: prairie falcon nests located in the cliffs to the west of 10.3 miles of route segment; peregrine falcon nests in the cliffs near 4.4 miles of the segment; bald eagle nests on Goose Island and in a wetland on the east shore of the Columbia River, occurring near 1.9 miles of the segment; and golden eagle nests in the cliffs near 2.3 miles of the route segment. Route Segment 3b also crosses 10.2 miles of JBLM YTC's Bald Eagle Protection Area and 0.6 mile of WDFW's Bald Eagle Management Zone. Bald eagles are known to winter along the Columbia River's western edge. Roosting bald eagles have been documented at Borden Springs (adjacent to mile 9.9), Hanson Creek (approximately 0.4 mile west of mile 12.4), and Alkali Canyon Creek (adjacent to mile 10.1; JBLM YTC 2002). Habitat in Borden Springs and Alkali Canyon has been altered by fires occurring in 1996. Two suitable roost trees remained and were utilized at Borden Springs following the fire, while no evidence of roosting at Alkali Canyon Creek has been documented since the fire (JBLM YTC 2002). Bald eagles wintering in the area have been observed foraging along Priest Rapids Lake during the day. Wintering bald eagles are typically present from between November and April, with peak abundance occurring in February (JBLM YTC 2002).

Potential impacts to raptors would occur from biological disturbance during construction activities or from injury or mortality from vehicle strikes or interactions with other equipment used during construction. Noise from construction equipment and general construction activities could disturb and displace individuals on a short-term basis with little impact. Biological change would occur from the long-term loss and degradation of foraging habitat and reduction in preferred habitat for prey species. It is anticipated that no large trees suitable for roosting, perching and nesting would be removed. Project design features would be implemented to reduce short- and long-term impacts and include: maintaining intact vegetation wherever possible; minimizing the blading of native plant communities during construction, consistent with safe construction practices; utilizing overland travel where feasible; reseeding disturbed areas using an Agency approved mixture of native and non-native species or seed for revegetation as detailed in POD; and developing and incorporating a Noxious Weed and Invasive Plant Management Plan and a Fire Protection and Control Plan into the final POD. In addition, implementation of the following seasonal restrictions and buffers to avoid nesting raptors during construction would limit disturbance during breeding and further reduce potential impacts: peregrine falcon – one mile buffer from February through August; prairie falcon – 0.25 mile buffer from April through August; bald eagle – one mile buffer from January through August; and golden eagle – 0.5 mile buffer from January through August. With the implementation of project design features, the scale of biological change and biological disturbance to nesting raptors and their habitat is anticipated to range between insignificant to significant and impacts levels are expected to include 10.5 miles of moderate and 11.2 miles of low impacts.

In general, raptors are considered less susceptible to collisions with overhead wires than other groups of birds; however an increased risk of collision occurs where there are repeated flights across power lines, especially in bad weather or pursuing prey (APLIC 1994; APLIC 2006; Manosa and Real 2001). The Project Proponent's Bird Management Program Guidelines includes protocol for documenting the incidence of mortalities from collision with the line and problem nests, contacting the appropriate resource agency and additional actions to be taken to reduce mortalities (i.e., installing bird flight diverters or marking static wires in sensitive areas when warranted; PacifiCorp 2006). Impacts to raptors from collisions with overhead wires are expected to be low.

Waterfowl and Shorebirds

A waterfowl and a common loon Priority Species Regional Area have been identified for Priest Rapids Lake. These areas have high concentrations of waterfowl present during the fall and winter months and common loon have been observed in the area during migration and winter. Approximately five miles of this route segment runs along the margin of, but does not cross, these waterfowl and common loon areas. Goose Island, situated within Priest Rapids Lake and almost one mile east of Route Segment 3b, has a mixed breeding colony of great blue heron and black-crowned night heron rookery located there. Concentrations of American white pelican, Caspian tern, and Forster's tern have been documented on an island south of Wanapum Dam and approximately 0.5 mile east of Route Segment 3b.

Waterfowl and shorebird injury and mortality could occur through collision with the transmission line. Available literature indicates that waterfowl, including ducks, geese, swans, cranes, and shorebirds appear to be most susceptible to collisions when power lines are located near wetlands (Erickson et al. 2005; Faanes 1987; Anderson 1978). Large, heavy-bodied birds with longer wings (i.e., herons, cranes, swans, and pelicans) tend to be less maneuverable than smaller birds and can be more susceptible to collision with overhead wires (CEC 2002; APLIC 1994). Bird movement patterns in the area are not known, however, migrating waterfowl arriving and departing from Priest Rapids Lake could collide with the transmission line and structures, including overhead grounding/shield wires. Most of the wetlands associated with Priest Rapids Lake are located along the river bank and east of the transmission line; however there are several inlets that this route segment would bisect and collisions could occur if these species are flying between these inlets and open water. No agricultural fields are located to the west of this route segment that may be seasonally attractive to flocking species such as cranes and waterfowl. In addition to collision with the transmission line structures, waterfowl could experience increased predation by raptors using the transmission poles as perch sites. The Project operator's Bird Management Program Guidelines includes protocol for documenting the incidence of mortalities from collision with the line, contacting the appropriate resource agency and implementing, where practicable, additional actions to reduce mortalities (i.e., installing bird flight diverters or marking static wires in sensitive areas where warranted; PacifiCorp 2006). Additional project design features that would be implemented to reduce impacts to waterfowl and shorebirds include the following: closing access roads that are not required for operation and maintenance; adhering to reasonable speed limits; and avoiding sensitive features such as wetlands, riparian areas, and water courses. With the implementation of project design features, the scale of biological change and biological disturbance to waterfowl, shorebirds and their habitat is anticipated to range between insignificant to significant and impacts levels are expected to include 5.4 miles of moderate and 16.3 miles of low impacts.

4.3.4.10 Route Segment 3c (Agency Preferred Alternative)

Habitat
Short-term disturbance would occur to approximately 95.5 acres and would be comprised of: 11.9 acres of sagebrush/perennial grassland (less than one percent of available sagebrush/perennial grassland in the Project area); 7.3 acres of disturbed/developed land (less than one percent of available land); 3.8 acres of annual grassland (less than one percent of available in Project area); 2.4 acres of rabbitbrush/annual grassland (approximately six percent of available rabbitbrush/annual grassland habitat within the Project area); 0.6 acre basalt cliffs/rock (approximately seven percent of basalt cliffs within Project area); 0.6 acre of sagebrush/annual grassland (less than one percent of sagebrush/annual grassland habitat within Project area); and 0.3 acre of riparian habitat (less than one percent available within Project area. Long-term disturbance to approximately 26.3 acres of habitat would occur from construction of Route Segment 3c and is comprised of: 37.7 acres of sagebrush/perennial grassland (less than one percent of available sagebrush/perennial grassland present within the Project area); 33.6 acres of disturbed/developed land (less than one percent of available land); 8.2 acres of rabbitbrush/annual grassland (approximately 20.4 percent of rabbitbrush/annual grassland available within the Project area); 2.2 acres of sagebrush/annual grassland (less than one percent of available habitat within Project area); 1.2 acres of riparian (less than one percent available within Project area); and 1.1 acres of basalt cliffs/rock (approximately 13 percent of Project area; Tables 4.3-3 and 4.3-4). Lower Crab Creek has some emergent riparian vegetation and open water associated with it. Unless it is identified during Project design that this area could be spanned, removal of riparian vegetation would constitute a moderate impact level. As described above for Route Segment 1a, project design features would be implemented to minimize the scale of biological change to wildlife. With the implementation of project design features described above, the scale of biological change to habitat is anticipated to range between insignificant and significant; impacts levels to habitat are expected to be low for 15.8 miles and moderate for 9.6 miles.

General Wildlife
Impacts to general wildlife from construction of Route Segment 3c would be similar to those described for Route Segment 1a. Construction noise may have an increased impact in the portion of the route segment adjacent to the Beverly Sand Dunes OHV Park, near the north side of Lower Crab Creek if wildlife species are utilizing the area to avoid OHV activity. Trees along the Columbia River, basalt cliffs, and several transmission lines in the area provide existing perch sites for raptors and corvids and Route Segment 3c would add an additional 186 structures, with approximately 119 of these structures further than 0.25 mile of an existing transmission line (Table 4.3-5).

Special Status Species
Although not documented along Route Segment 1b, suitable habitat is present for side-blotched lizard, black-throated sparrow, cedar waxwing, gray flycatcher, loggerhead shrike, Oregon vesper sparrow, sage sparrow, sage thrasher, ferruginous hawk, black-tailed jackrabbit, white-tailed jackrabbit, Cascade red fox, Merriam's shrew, Preble's shrew, and Townsend's ground squirrels. Impacts to these species would be similar to those described in Route Segment 1a. Project design features described above for Route Segment 1a are also anticipated to be effective at minimizing impacts to special status species that may occur in the Project area. For Route Segment 3c, the scale of biological change and biological disturbance to special status wildlife species is anticipated to be insignificant or minor and impacts levels are expected to be low for the entire route segment.

Amphibians and Reptiles
Sagebrush lizard, striped whipsnake and nightsnake have been documented within a half mile of the northern end of Route Segment 3c. Impacts to these species would be similar to those described for Route Segment 3a. Impacts to these species could occur from biological disturbance, including injury or mortality from vehicle strikes and equipment and increased predation, and biological change through direct habitat loss or degradation. Project design features described above for Route Segment 1a are also anticipated to be effective at minimizing impacts to amphibians and reptiles. Project design features include the following: restricting construction and maintenance activities during sensitive periods; adhering to reasonable speed limits in construction areas; and closing or rehabilitating new or improved access that is not required for maintenance. For Route Segment 3c, construction and operation is anticipated to cause some biological change or biological disturbance to amphibians and reptiles, ranging between significant to insignificant and impact levels are expected to be 5.1 miles of moderate and 20.3 miles of low impacts.

Black-tailed Jackrabbit
Black-tailed jackrabbits have been documented with a half mile of 1.7 miles of Route Segment 3c. Impacts to black-tailed jackrabbits would be similar to those described for Route Segment 2b. Project design features such as closing access roads not required for maintenance, reseeding disturbed areas, implementing a noxious weed control plan, and adherence to reasonable speed limits would reduce the scale of biological disturbance and biological change that would occur. For Route Segment 3c, the scale of biological change and biological disturbance to black-tailed jackrabbit is anticipated to range between insignificant and significant and impacts levels are expected to be moderate for 1.7 miles and low for 23.7 miles.

Chinook Salmon
Route Segment 3c parallels the Hanford Reach for approximately four miles. This route segment parallels and crosses the Columbia River at Vernita Bar, gravel bars critical to fall Chinook salmon spawning (Nugent et al. 2002). No structure or road construction work would occur within the Columbia River. For the Columbia River crossing the structures would be approximately 200 foot tall lattice steel structures for the up to 2,800 foot crossing. Impacts to Chinook salmon from the construction of Route Segment 3c could include increased erosion, sedimentation and elevated turbidity. The potential for impacts would be minimized by implementing project design features that apply and maintain standard erosion and sediment control methods. Specific erosion and sediment control measures and locations would be specified in the SWPPP. These may include straw waddles, straw bale barriers and silt fencing which would be placed at construction boundaries. For Route Segment 3c, the scale of biological change and biological disturbance to Chinook salmon is anticipated to be insignificant or minor and impacts levels are expected to be low for the entire route segment.

Chukar
Route Segment 3c crosses two chukar Priority Species Regional Areas. Route Segment 3c crosses 0.3 mile of the chukar Regional Area south of the Columbia River. This area is a dry rocky slope comprised of sagebrush and perennial grasses. The second Regional Area crossed (2.4 miles) occurs just south of Lower Crab Creek. This area is a mixture of sagebrush and perennial and annual grasslands, with some emergent riparian vegetation present along Lower Crab Creek. Impacts to chukar include disturbance or displacement, injury or mortality from vehicle strikes and equipment, and direct habitat loss or degradation. Noise from construction equipment and general construction activities could disturb and displace chukar on a short-term basis. In addition, the transmission poles would serve as perch sites for raptor species, which could prey on chukar. The implementation of project design features are anticipated to reduce impacts to chukar, and include: closing access roads not required for maintenance, reseeding disturbed areas, implementing a noxious weed control plan, and adherence to reasonable speed limits. For

Route Segment 3c, the scale of biological change and biological disturbance to chukar is anticipated to range between insignificant and significant and include 2.7 miles of moderate and 22.7 miles of low impacts.

Greater Sage-Grouse

Short- (45.0 acres) and long-term (22.5 acres) disturbance associated with the construction of Route Segment 3c would occur within the Occasionally Occupied Habitat (Tier 3) unit for sage-grouse. The remaining disturbance would occur in Tier 1, Regularly Occupied Habitat (6.7 acres of short- term and 3.6 acres of long-term disturbance) and Tier 4, Expansion Habitat (13.2 acres of short-term and 4.4 acres of long-term disturbance; Table 4.3-6 and 4.3-7). The Tier 1 Habitat present in the Project area consists of approximately 416,031 acres, the Tier 3 Habitat is approximately 6,300 acres in size, and Tier 4 Habitat is approximately 3,290 acres. Construction activities would disturb approximately 0.3 percent of Tier 3 Habitat on a short-term basis and 0.1 percent on a long-term basis (Tables 4.3-6 and 4.3-7). Breeding, late brood rearing or winter habitat was identified as suitable for 12.2 miles, marginal for 3.6 miles and unsuitable for 9.6 miles. Impacts to greater sage-grouse are discussed in detail in Section 4.3.3.2 and are similar to those described for Route Segment 1a. Route Segment 3c would be within an existing power line corridor that accommodates the Hanford-Vantage #1 500 kV line for approximately seven miles. Agricultural lands occur on both sides of the corridor for approximately eight miles. An existing road would be paralleled for approximately nine miles. Existing disturbed areas were utilized to minimize disturbance to sage-grouse habitat. Impacts to greater sage-grouse are discussed in detail in Section 4.3.3.2 and are similar to those described for Route Segment 1a. With the implementation of project design features described above, the scale of biological change to sage-grouse habitat is anticipated to range between insignificant and significant and are expected to include 12.2 miles of moderate and 13.2 miles of low impacts.

No active, inactive or historical leks are known to occur within 0.6, two or four miles of Route Segment 3c (Table 4.3-8). In addition to project design features to minimize impact to sage-grouse habitat, impacts to sage-grouse leks would be reduced through the implementation of project design features including: the development of a Wildlife Protection Plans which would identify specific measures and could include ROW clearance surveys prior to construction and the use of biological monitors to protect biological resources during construction; and avoiding construction or maintenance activities within 0.6 mile of active leks from February to June and minimizing disturbance from construction and development activities, particularly within 0.6 mile of breeding habitat from February through June. With the implementation of project design features, the scale of biological change and biological disturbance to lekking greater sage-grouse with the construction of Route Segment 3c is anticipated to be insignificant or minor and impacts levels are expected to be low for the entire route segment.

Raptors

Several raptor nests have been documented within one mile of Route Segment 3c. Prairie falcon nests have been observed in the cliffs south of the Columbia River (3.2 miles) and associated with the Saddle Mountains (2.6 miles). Peregrine falcon nests have been documented in the cliffs south of the Columbia River near 2.4 miles of the route segment. Golden eagles have been observed nesting in the cliffs associated with the Saddle Mountains near 1.3 miles along the route segment. Potential impacts to raptors are similar to those described for 3b. Biological change would occur from the long-term loss and degradation of foraging habitat and reduction in preferred habitat for prey species. It is anticipated that no large trees suitable for roosting, perching and nesting would be removed. Project design features would be implemented to reduce short- and long-term impacts and include: maintaining intact vegetation wherever possible; minimizing the blading of native plant communities during construction, consistent with safe construction practices; utilizing overland travel where feasible; reseeding disturbed areas using an Agency approved mixture of native and non-native species or seed for revegetation as detailed in POD; and developing and incorporating a Noxious Weed and Invasive Plant Management Plan and a Fire Protection and Control Plan into the final POD. In addition, implementation of the following seasonal restrictions and buffers to avoid nesting raptors during construction would limit disturbance during breeding and further reduce potential impacts: peregrine falcon – one mile buffer from February through August; prairie falcon – 0.25 mile buffer from April through August; and golden eagle – 0.5 mile buffer from January through August. With the implementation of project design features, the scale of biological change and biological disturbance to nesting raptors and their habitat is anticipated to range between insignificant to significant and impacts levels are expected to include 14.3 miles of moderate and 11.1 miles of low impacts.

Waterfowl and Shorebirds
A waterfowl Priority Species Regional Area have been identified for Nunnally Lake. This lake has high numbers of waterfowl present during the fall and winter months. This route segment occurs approximately 0.1 mile west of Nunnally Lake, but does not cross it.

Impacts to waterfowl and shorebirds are similar to those described for Route Segment 3b. Waterfowl and shorebird injury and mortality could occur through collision with the transmission line. Bird movement patterns in the area are not known, however, migrating waterfowl arriving and departing from Nunnally Lake and Burkett Lake could collide with the transmission line and structures, including overhead grounding/shield wires. Agricultural fields are located primarily north of Nunnally Lake, east of this route segment that may be seasonally attractive to flocking species such as cranes and waterfowl. In addition to collision with the transmission line structures, waterfowl could experience increased predation by raptors using the transmission poles as perch sites. The Project operator's Bird Management Program Guidelines includes protocol for documenting the incidence of mortalities from collision with the line, contacting the appropriate resource agency and implementing, where practicable, additional actions to reduce mortalities (i.e., installing bird flight diverters or marking static wires in sensitive areas where warranted; PacifiCorp 2006). Additional project design features that would be implemented to reduce impacts to waterfowl and shorebirds include the following: closing access roads that are not required for operation and maintenance; adhering to reasonable speed limits; and avoiding sensitive features such as wetlands, riparian areas, and water courses. With the implementation of project design features, the scale of biological change and biological disturbance to waterfowl, shorebirds and their habitat is anticipated to range between insignificant to significant and impacts levels are expected to include 0.5 miles of moderate and 24.9 miles of low impacts.

4.3.5 Mitigation Measures

The project design features and environmental protection measures described in Section 2.5 (Project Design Features Common to Action Alternatives) have been incorporated into the project design and would be implemented during construction and operation of the proposed Project. These measures are designed to avoid or minimize environmental impacts from Project construction, operation and maintenance activities and are items that Pacific Power has committed to implement as part of the Project development; therefore, no additional mitigation would be required.

4.3.6 Impact Summary By Alternative

4.3.6.1 No Action

Under the No Action Alternative, the proposed Project would not be constructed or operated. No Project-related impacts to wildlife would occur, but changes in habitat and species composition would continue as a result of natural conditions and future development. Refer to section 4.17 Cumulative Effects for a discussion of potential future development.

4.3.6.2 Route Alternatives

Table 4.3-9 presents a summary of the impacts for each of the end-to-end alternatives and impact levels following the implementation of project design features for wildlife species, excluding sage-grouse. The impact summary for sage-grouse is presented separately in Table 4.3-10.

Alternatives F and H cross the fewest miles of Priority Species Regional Areas (4.1 miles each) and the highest miles of Priority Species Regional Areas would be crossed by Alternatives B and C (24.1 miles each). Alternatives B and C cross Priority Species Regional Areas within Route Segment1b (long-billed curlew) and Route Segment 3b (chukar, mule deer and waterfowl). Project design features that would be implemented to minimize impacts to Priority Species Regional Areas include closing access roads not required for maintenance, reseeding disturbed areas, implementing a noxious weed control plan, adhering to reasonable speed limits and employing seasonal restrictions and buffers during breeding periods.

Alternatives A and F have the lowest number of miles with nest points occurring within one mile (14.0 miles each), while Alternatives C and G cross the highest number of miles (26.8 miles each). For Alternatives C and G, nests points within one mile include Route Segment 2c (burrowing owl, long-billed curlew) and Route Segment 2d (ferruginous hawk, prairie falcon), but are primarily associated with Route Segment 3b (loggerhead shrike, prairie falcon, peregrine falcon, bald eagle and golden eagle). Project design features would be implemented to reduce short- and long-term impacts to nesting species include: maintaining intact vegetation wherever possible; minimizing the blading of native plant communities during construction, consistent with safe construction practices; utilizing overland travel where feasible; reseeding disturbed areas using an Agency approved mixture of native and non-native species or seed for revegetation as detailed in the POD; and developing and incorporating a Noxious Weed and Invasive Plant Management Plan and a Fire Protection and Control Plan into the final POD.

Alternative G crosses fewest miles of highly sensitive habitats (20.5 miles), while Alternative A crosses the most (32.7 miles). Sensitive habitat for Alternative A is primarily associated with Route Segments 1b (aspen grove), 2b (sagebrush/perennial grassland), and 3b (riparian vegetation associated with Lower Crab Creek). Alternative A would disturb a nominal amount, approximately 0.1 percent (51.8 acres), of highly sensitive habitats present within the Project area (49,147.3 acres). Project design features that would be implemented to minimize impacts to sensitive habitats include: maintaining intact vegetation wherever possible; minimizing the blading of native plant communities during construction, consistent with safe construction practices; utilizing overland travel where feasible; and reseeding disturbed areas using an Agency approved mixture of native and non-native species or seed for revegetation as detailed in the POD.

Overall, no high impacts would occur with any of the end-to-end alternatives. Alternative B would have the highest number of miles with moderate impacts (49.7 miles) and Alternative H would have the lowest (35.0 miles).

Sage-Grouse

Alternative A crosses the most miles of suitable habitat for sage-grouse (34.4 miles) and Alternative G crosses the fewest (22.5 miles). For Alternative A, suitable habitat is associated primarily with Route Segments 2b and 3c. Project design features that would be implemented to reduce impacts to sage-grouse habitat include: maintaining intact vegetation wherever possible; minimizing the blading of native plant communities during construction, consistent with safe construction practices; utilizing overland travel where feasible; reseeding disturbed areas using an Agency approved mixture of native and non-native species or seed for revegetation as detailed in the POD; and developing and incorporating a Noxious Weed and Invasive Plant Management Plan and a Fire Protection and Control Plan into the final POD.

Approximately ten leks have been active since 1999 on JBLM YTC. No active or inactive leks occur within 0.6 mile of any of the end-to-end alternatives. Alternatives B and E have the most active or inactive leks occurring within two miles (5 leks each), associated with Route Segments 1b, 1c, 2b, and 3b. Impacts to sage-grouse leks would be reduced through the implementation of project design features including: the development of a Wildlife Protection Plans which would identify specific measures and could include ROW clearance surveys prior to construction and the use of biological monitors to protect biological resources during construction; and avoiding construction or maintenance activities within 0.6 mile of active leks from February to June and minimizing disturbance from construction and development activities, particularly within 0.6 mile of breeding habitat from February through June.

Overall, no high impacts would occur with any of the end-to-end alternatives. Alternative B would have the highest miles of moderate impacts to sage-grouse and its habitat (49.7 miles) and Alternative H would have the lowest miles of moderate impacts (35.0 miles). All of the Alternatives would be in accordance with sage-grouse conservation strategies identified in the Recovery Plan. These include:

- Protecting active sage-grouse leks from human disturbance by minimizing disturbance from construction and development activities, particularly within 0.6 mile (1.0 kilometer) of breeding habitat during February - June. There are no known active leks within 0.6 mile of any of the alternatives.
- Protecting nesting and brood rearing areas from disturbance by preventing disturbance in sage-grouse nesting and brood rearing habitat between March 1 and June 15. This strategy has been incorporated into the project design features for all alternatives.
- New power lines and utilities should utilize existing corridors or be located so as to minimize collision risk and damage to habitat. To the extent practicable, the proposed Project has been sited to utilize existing corridors and disturbed locations.
- Protecting habitat from fire. Project design features would be implemented for all of the alternatives that would reduce the potential for wildland fire through the construction and operation of the proposed Project.
- Protecting habitat through the use of native seed sources, suppressing cheatgrass and weeds, and reestablishing sagebrush. Project design features would be implemented for all of the alternatives to protect sage-grouse habitat, including treating and preventing the spread of noxious weeds and invasive plants and reseeding disturbed areas with an agency approved seed mixture.

TABLE 4.3-9 IMPACTS TO SPECIAL STATUS WILDLIFE AND IMPACT SUMMARY OF END-TO-END ALTERNATIVES (MILES)

END TO END ALTERNATIVES	PRIORITY SPECIES REGIONAL AREAS CROSSED	SENSITIVE SPECIES NEST POINTS WITHIN 1 MILE[2]	SENSITIVE SPECIES OBSERVATION POINTS WITHIN 0.5 MILE[3]	WILDLIFE HABITAT (HIGH SENSITIVITY)[4]	IMPACTS[1]			
					HIGH	MODERATE	LOW	NO IDENTIFIABLE
Alternative A 1a, 1b, 2a, 2b, 2d, 3a, 3c 64.5 miles	7.2	14.0	10.1	32.7	0	44.4	20.1	0
Alternative B 1a, 1b, 2a, 2b, 2d, 3a, 3b 61.0 miles	24.1	20.7	10.9	30.2	0	49.7	11.3	0
Alternative C 1a, 1b, 2a, 2c, 2d, 3a, 3b 62.8 miles	24.1	26.8	9.0	23.7	0	45.3	17.5	0
Alternative D (Agency Preferred Alternative) 1a, 1b, 2a, 2c, 2d, 3a, 3c 66.3 miles	7.2	20.1	8.2	26.1	0	40.1	26.2	0
Alternative E 1a, 1c, 2a, 2b, 2d, 3a, 3b 61.4 miles	21	20.7	10.9	27.0	0	44.6	16.8	0
Alternative F 1a, 1c, 2a, 2b, 2d, 3a, 3c 64.9 miles	4.1	14.0	10.1	29.5	0	39.3	25.6	0
Alternative G 1a, 1c, 2a, 2c, 2d, 3a, 3b 63.2 miles	21	26.8	9.0	20.5	0	40.2	23.0	0
Alternative H 1a, 1c, 2a, 2c, 2d, 3a, 3c 66.7 miles	4.1	20.1	8.2	22.9	0	35.0	31.7	0

Notes: [1]Impact levels in linear miles. Impacts may be reduced further through site specific engineering and design in conjunction with mitigation. [2]Miles of route segment with nest points within one mile. [3]Miles of route segment with observations occurring within 0.5 mile. [4]High sensitivity habitat included riparian, perennial streams/marsh; sagebrush/perennial grassland; and tree (aspen and poplar).

TABLE 4.3-10 IMPACTS TO GREATER SAGE-GROUSE AND IMPACT SUMMARY OF END-TO-END ALTERNATIVES (MILES)

END TO END ALTERNATIVES	GREATER SAGE-GROUSE HABITAT (MILES)[1]			ACTIVE OR INACTIVE LEKS (NUMBER)			PHS HISTORIC LEKS (NUMBER)			IMPACTS (MILES)[2]			
	SUITABLE	MARGINAL	UNSUITABLE	WITHIN 0.6 MILE	WITHIN 2 MILES	WITHIN 3 MILES	WITHIN 0.6 MILE	WITHIN 2 MILES	WITHIN 3 MILES	HIGH	MODERATE	LOW	NO IDENTIFIABLE
Alternative A 1a, 1b, 2a, 2b, 2d, 3a, 3c 64.5 miles	34.4	12.7	17.4	0	4	5	1	2	4	0	34.4	30.1	0
Alternative B 1a, 1b, 2a, 2b, 2d, 3a, 3b 61.0 miles	30.6	10.2	20.2	0	5	6	1	2	4	0	30.6	30.4	0
Alternative C 1a, 1b, 2a, 2c, 2d, 3a, 3b 62.8 miles	24.8	11.2	26.8	0	3	6	1	2	4	0	24.8	38	0
Alternative D (Agency Preferred Alternative) 1a, 1b, 2a, 2c, 2d, 3a, 3c 66.3 miles	28.7	13.7	23.9	0	2	5	1	2	4	0	28.7	37.6	0
Alternative E 1a, 1c, 2a, 2b, 2d, 3a, 3b 61.4 miles	28.3	16.9	16.2	0	5	6	0	2	3	0	28.2	33.2	0
Alternative F 1a, 1c, 2a, 2b, 2d, 3a, 3c 64.9 miles	32.1	19.4	13.4	0	4	5	0	2	3	0	32.1	32.8	0
Alternative G 1a, 1c, 2a, 2c, 2d, 3a, 3b 63.2 miles	22.5	17.9	22.8	0	3	6	0	2	3	0	22.5	40.7	0

END TO END ALTERNATIVES	GREATER SAGE-GROUSE HABITAT (MILES)[1]			ACTIVE OR INACTIVE LEKS (NUMBER)			PHS HISTORIC LEKS (NUMBER)			IMPACTS (MILES)[2]			
	SUITABLE	MARGINAL	UNSUITABLE	WITHIN 0.6 MILE	WITHIN 2 MILES	WITHIN 3 MILES	WITHIN 0.6 MILE	WITHIN 2 MILES	WITHIN 3 MILES	HIGH	MODERATE	LOW	NO IDENTIFIABLE
Alternative H 1a, 1c, 2a, 2c, 2d, 3a, 3c 66.7 miles	26.4	20.4	19.9	0	2	5	0	2	3	0	26.4	40.3	0

Notes: [1]Sage-grouse habitat was assessed using the sage-grouse habitat survey data and, in locations not surveyed, through aerial interpretation using adjacent survey information, 2001 JBLM YTC vegetation data, GAP data and fire history data. Habitat was considered suitable if suitable breeding, late brood-rearing or winter habitat was present. [2]Impact levels in linear miles. Impacts may be reduced further through site specific engineering and design in conjunction with mitigation.

4.4 LAND USE

Land use impacts would occur as a result of the construction, operation and maintenance of the Project, and would be caused by the displacement or alteration of existing uses.

4.4.1 Methods and Impact Types

4.4.1.1 Analysis Methods

The methodology used to assess impacts on land use included:

- Identifying the types of Project effects on land uses;
- Evaluating the sensitivity of specific land uses to change;
- Developing criteria for assessing impact intensity;
- Assessing impacts based on project design features;
- Introducing specific mitigation measures in specific locations to reduce impacts;
- Evaluating residual impacts; and
- Comparing alternatives based on land use impacts.

4.4.1.2 Impact Criteria

Resource sensitivity was considered in determining how susceptible to change land uses would be from the introduction of the proposed transmission line. Land use impacts were based on sensitivity and potential change that could occur to land uses as a result of Project construction.

Sensitivity is a measure of the probable responses that a land use would have to the direct and indirect impacts associated with the construction and operation of the proposed transmission line. Refer to Table 4.4-1 for land use resource sensitivity.

Potential change describes the physical, operational or social changes that could potentially occur to a land use. Changes are brought about by:

- Acquisition of land or property rights to accommodate the transmission line;
- Installing the transmission line;
- The physical presence and operation of the transmission line; and
- Managing the right-of-way (ROW) and maintaining the transmission line.

The potential for change from introducing the transmission line differs from one land use category to another with respect to what might be altered and to what extent. This potential for change is predicted by evaluating the environmental conditions, the Project description, and project design features.

4.4.1.3 Impact Types

Physical impacts to land uses were assessed along the centerline of each of the route segments for the inventoried land use categories. The impact types identified for land uses along the centerlines of alternative route segments include any impact that:

- Displaces, alters, or otherwise physically affects any existing, developing or planned residential, commercial, industrial, governmental, or institutional use or activity.
- Displaces, alters, or otherwise physically affects any existing agricultural use or activity.
- Alters or otherwise physically affects any established, designated or planned park, recreation, preservation, or educational use area or activity.

- Affects applicable comprehensive and regional plans and/or approved, adopted, or officially stated policies, goals, or operations of communities or governmental agencies.

The impacts of the Project on land jurisdictions primarily involve land policies, land management plans, and permitting requirements of federal, state, and local agencies. The land jurisdictions mapped in the inventory were used to identify the potentially affected land management agencies and to quantify the land area potentially affected by the route segments (see Jurisdiction, Recreation and Special Management Areas map, Appendix A).

The crossing or paralleling of existing utilities is a matter of technical coordination and realty agreements with the affected utilities. Impacts were not assessed for these situations.

TABLE 4.4-1 LAND USE RESOURCES SENSITIVITY CLASSIFICATION

LAND USE	SENSITIVITY
Agricultural Land (Dryland, Irrigated, Feedlots, etc.)	High
Residential	High
Recreation or Conservation	High
Military (Joint Base Lewis-McChord Yakima Training Center)	Moderate
Prime/Unique/Statewide Important Farmlands (non-Ag)	Moderate
Conservation Reserve Program (CRP) Land (Known Land and Sections containing CRP land)	Moderate
Gravel Mine/Extractive Areas	Moderate
Potential Wind Farm Areas	Moderate
Rangeland (U.S. Bureau of Land Management/State Lease Lands)	Low
Undeveloped/Grazing/Vacant	Low

4.4.2 Impact Levels

Potential impacts to land use resources were assessed along the assumed centerline of the proposed 230 kilovolt (kV) transmission line and access roads. The assumed centerline of the proposed 230 kV transmission line for land use impact assessment is 125 feet wide (i.e., the proposed ROW width).

High
Impacts would be considered high where the Project would:

- Cause direct impacts and conflict with high sensitivity land uses;
- Physically conflict with the use of residences or agricultural operations such as the displacement of occupied residences or conflicts with center pivot irrigation structures or agricultural buildings;
- Create areas of non-inhabitable land where residential uses already exist or are permitted;
- Potentially affect military training maneuvers and operations; and/or
- Prevent the use of the land according to existing land management plans.

Moderate
Impacts would be considered moderate where the Project would:

- Adversely affect properties by eliminating or limiting the potential for development to occur around or underneath the transmission lines and/or transmission structures;
- Cause indirect impacts to high or moderate sensitivity land uses;
- Cause direct, long-term impacts to Prime Farmland not currently under cultivation;
- Cause direct, long-term impacts to known Conservation Reserve Program (CRP) lands or sections containing CRP land (unknown location);
- Occupy military land but does not substantially alter training operations;

- Alter the use of the land according to existing land management plans; and/or
- Cause short-term impacts to agricultural operations or land.

Low
Impacts would be considered low where the Project would:

- Create short-term disturbances during construction to any land use sensitivity; and/or
- Be compatible with low sensitivity land uses

No impact would occur where land uses would be able to continue as they currently exist. Private land that is not residential or agricultural is assumed to potentially be used for grazing, and low impacts may occur. Public lands that are not leased for grazing, agriculture, or other uses would be able to continue as they currently exist, and the Project would not result in a change to the use.

4.4.3 Impacts Common to All Route Segments

Land uses within or near the alternative route segments would be temporarily disrupted by construction activities such as noise, dust, and traffic. Construction of the Project would temporarily disturb these areas as a result of heavy construction equipment on temporary and permanent access roads, moving building materials to structure sites and returning to construction staging areas.

Construction of the route would involve installation of new transmission structures. Installation of the new transmission structures would temporarily disturb land use/cover at each H-frame or single pole location. Established land uses at the proposed H-frame or single pole locations would be temporarily displaced during construction.

Short-term land disturbances would result in a moderate impact in areas where developed land uses occur within or adjacent to the proposed ROW (includes residences within 500 feet of a route segment).

After the transmission line has been constructed, land uses that are compatible with safety regulations would be permitted in and adjacent to the ROW. Existing land uses such as agriculture and grazing are generally permitted within the ROW. Incompatible land uses within the ROW include construction and maintenance of inhabited dwellings, and any use requiring changes in surface elevation that would affect electrical clearances of existing or planned facilities.

Land uses that comply with local regulations would generally be permitted adjacent to the ROW. Compatible uses of the ROW on either federal or state lands would have to be approved by the applicable federal or state land management agency. Permission to use the ROW on private lands would be determined by Pacific Power in consultation with the landowner.

The transmission line Columbia River crossing structures could potentially affect aviation activities by modifying aircraft operations and air navigation. With regard to aviation safety, Subpart B, Section 77.13 of the guidelines of the Federal Aviation Administration (FAA) indicate that construction of a project could potentially have a significant impact on aviation activities if a structure or any equipment is positioned such that it would be more than 200 feet above the ground or if an object would penetrate the imaginary surface extending outward and upward at a ratio of 100 to 1 from a public or military airport runway out to a horizontal distance of 20,000 feet (approximately 3.78 miles). If either of these conditions is met, an applicant is required to submit FAA Form 7460-1, Notice of Proposed Construction or Alteration, to the Manager, Air Traffic Division, FAA Regional Office having jurisdiction over the area for review and approval of the Project.

The Project will comply with all appropriate regulations of the FAA, and Form 7460-1 would be required of Pacific Power pursuant to FAA Regulations, Part 77. Final locations of the crossing structures, and structure heights, including the transmission lines (conductors), and construction related equipment or facilities that might impact air navigation would be submitted to the FAA for the Project. The Washington State Department of Transportation - Aviation Division will also be contacted.

4.4.4 Impacts Specific to Route Segments

Long-term and short-term impacts to land use were assessed for each route segment and are presented in Table 4.4-2. Impacts for each route segment are discussed in detail in the following sections.

4.4.4.1 Route Segment 1a (Agency Preferred Alternative)

No direct or high impacts are anticipated in this route segment. During ROW acquisition and detailed design, the assumed centerline of this route segment would be adjusted to avoid the need for removal of dwellings or related structures from the transmission line ROW. Therefore with prudent adjustments to the location of the route, ROW and structure placement no direct impacts to existing dwellings or related structures are foreseen. Moderate impacts would result from long-term elimination or limitation of any structure placement or development under the transmission line within the ROW.

Overall impacts would be moderate because the Project would eliminate the potential for further development (see Table 4.4-2 Long-Term Disturbance to Land Use and Management by Route Segment). However, most of this route is located within or adjacent to the ROW of Sage Trail Road, and single pole structures would be used. Higher impacts would occur between mile posts (MP) 1.6 and 2.0, where the ROW would traverse residential parcels and heavy angle structures would be utilized, affecting a higher proportion of undeveloped residential land with the necessary guy wires and additional wood pole structures. However impacts would remain moderate. Short-term impacts in low density residential areas would total 10.2 acres for this route segment.

This route segment also crosses land classified as Farmland of Statewide Importance, Farmland of Unique Importance, and Prime Farmland if Irrigated, causing 1.9 acres of long-term disturbance to these lands (see Table 4.4-3 Long-Term Impacts to Prime Farmland by Route Segment). However, this is currently non-agricultural land, so impacts would be low because no farmland would be converted to non-agricultural uses. Short-term impacts would total 10.2 acres on low density residential areas.

The Project would be in compliance with the Yakima County Comprehensive Plan and all applicable development regulations.

Moderate impacts would occur for 2.0 miles of this route segment.

4.4.4.2 Route Segment 1b (Agency Preferred Alternative)

Route Segment 1b would cause approximately 11.2 acres of long-term impacts on military land use on the perimeter of the Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) in Training Areas 11, 13, and 10. Military operations in this area would be minimally affected, however, because the Project would be on the perimeter of training activity areas and transmission line structures would be located adjacent to an existing fire break road. Impacts would be moderate, because activities could continue to occur. Short-term impacts would total 46.3 acres on military land use areas.

This route segment also crosses land classified as Farmland of Statewide Importance and Prime Farmland if Irrigated, causing 6.4 acres of long-term disturbance. However, this is non-agricultural land.

The Project would be in compliance with the Final Cultural and Natural Resources Management Plan for the JBLM YTC.

Overall, moderate impacts would occur for 12.6 miles of this route segment.

4.4.4.3 Route Segment 1c

Route Segment 1c is similar to Route Segment 1b except that is located outside of the JBLM YTC boundary. The land use for a good portion of the route segment is undeveloped rangeland, while agricultural land uses are located in the southern portion of this route segment between MP 9.5 and MP 10.5

Active agricultural operations would be temporarily impacted by construction activities associated with the construction and/or expansion of access roads, both temporary and permanent; pulling sites and construction equipment/vehicle staging areas; and the installation of H-frame or single pole structures and wires. These construction activities could temporarily interfere with active agricultural operations by damaging or removing crops, impeding access to certain fields or plots of land, obstructing farm vehicles and equipment, disrupting drainage and irrigation systems, and disrupting grazing activities, all of which could result in the temporary reduction of agricultural productivity.

Depending upon the extent of construction required for certain aspects of the proposed Project, soils, including those designated as Important Farmland, would be compacted as a result of construction activities, (i.e. the use of heavy construction equipment). This would create a short-term disturbance to agricultural soils that would impact active agricultural operations, such as the planting of crops. Short-term impacts would occur on 2.2 acres of irrigated cropland and 36.5 acres of low density residential areas.

Impacts to agricultural land would occur where the location of Project facilities, such as access roads and H-frame or single pole structures, would permanently convert the land upon which they are situated to non-agricultural use. This also includes soils designated as Important Farmland.

Loss of agricultural land would result in initial high and moderate impacts while grazing impacts would be low. Areas disturbed by construction would be minimal. Following rehabilitation, areas removed from use for the life of the Project would include the small areas at the structure footings and/or guy anchors, as well as new access roads.

Once construction is complete and the H-frame or single pole structures are in place, agricultural uses (e.g., crops, grazing) may be re-established/continued within the transmission line ROW. The loss of productive farmland will result in financial impacts to farmers. The amount of financial impact would depend on the type of crop since crop values fluctuate from year to year.

In addition to the long-term loss of land under active agricultural operations, the Project would result in other agricultural impacts in the vicinity of the Project. These include: disrupting farming facilities or operations and disrupting or altering aerial spraying practices.

The presence of new Project components would permanently disrupt active farming operations in nearby areas, by dividing or fragmenting agricultural fields, and disrupting the operation of farm equipment.

In some instances, maneuvering harvesting equipment around H-frame or single pole structures may be difficult. The level of difficulty would depend on the type of crop. Row crops that are perpendicular or diagonal to the transmission lines, rather than parallel, would be more difficult for large equipment maneuvering, such as field cultivators, combines, or other wide equipment. Equipment operators may have to make additional passes, additional maneuvers or otherwise modify seeding, irrigation or harvesting practices because of structure obstruction. Potential secondary effects include restrictions on nighttime operations (due to the potential for accidents), restrictions on normal crop rotations because of operational considerations, and increased difficulty in leasing fields with transmission line structures. Structures would also increase the need for weed and pest control activities around H-frame or single pole structure foundations. Agricultural lands that utilize certain types of irrigation systems may also be impacted by the placement of H-frame or single pole structures on cropland.

Aerial spraying (e.g., crop dusting) is used to fertilize crops and control insects, weeds, and diseases that may affect crops in the Project area. Aerial spraying occurs in those areas actively cultivated with field crops. Transmission lines and H-frame or single pole structures present a substantial obstacle to be avoided, and require additional attention from the pilots. In addition, the presence of a transmission line could affect spray coverage. Spray is applied at a downward angle to reduce over-spray and, as a result, areas immediately adjacent to the transmission structures could receive less product than desired. Section 4.16.9 discusses aerial spraying in more detail.

Global Positioning Systems (GPS) are used in a wide range of activities including several important agricultural activities such as monitoring pivot irrigation, tracking wheeled and tracked equipment movements during farming operations and checking the orientation of aerial spraying aircraft. Concerns have been expressed about the potential for interference to GPS systems from electrical fields from transmission lines. Due to the frequencies used by these devices and the modulation and processing techniques used, interference effects with GPS units are unlikely (Silva and Olsen 2002). Section 4.16.8 discusses GPS systems and studies that have been conducted to address whether transmission lines affect GPS systems operation and accuracy.

The route segment would potentially disturb 0.3 acre of irrigated agricultural land located north of and along Mieras Road. The wheel line operations in 0.1 acre of irrigated pasture land and 0.2 acre of apple crop operations will be affected in the long-term between MP 9.5 and MP 10.5, causing high impacts for 0.9 mile. A wheel line irrigation system located between MP 9.9 and MP 10.1 would be adversely affected because the Project runs diagonally across the field, potentially creating impacts if the wheel line needs to be separated and moved around the structures when the irrigation system traverses the field. This would cause additional costs to the land owner. Long-term impacts would occur to 0.2 acre of sprinkler irrigation areas and 0.2 acre of wheel line irrigation areas (see Table 4.4-7 Long-Term Disturbance to Irrigated Cropland by Route Segment). Short-term impacts would total 1.0 acre and 1.1 acre, respectively. Agricultural land along this route segment is not Prime Farmland.

Non-irrigated pasture and fallow land would also be affected by this route segment between MP 9.5 and MP 10.2. Long-term dryland agriculture impacts total 1.5 acres and short-term impacts total 0.4 acre for this route segment.

This route segment also crosses a short segment of land classified as Farmland of Unique Importance, causing 0.1 acre of long-term disturbance. However, this is non-agricultural land, and no farmland conversion would occur.

Route Segment 1c would cause approximately 19.0 acres of long-term impacts on residential land use, but overall impacts would be moderate because the Project would eliminate the potential for further development. At MP 5.9, the Project ROW would potentially bisect an existing residence and associated buildings located on Summerset Drive, causing high impacts for a short distance (MP 5.9-6.0). Other residential areas would also be affected by the presence of the transmission line and structures. The Project would impact residential property at MP 10.1, by eliminating or limiting the potential for future development to occur on the property, causing moderate impacts. Between MP 10.5 and 11.4, residential land use will be adversely affected in isolated areas because the Project would limit future residential activities. Short-term impacts in low density residential areas would total 36.5 acres for this route segment.

The Project would be in compliance with the Yakima County Comprehensive Plan and all applicable development regulations.

Overall, this route segment would create 1.0 mile of high impact and 1.2 miles of moderate impact.

4.4.4.4 Route Segment 2a (Agency Preferred Alternative)

This route segment would cause 2.1 acres of long-term impacts on undeveloped/grazing land. Short-term impacts on undeveloped/grazing land would total 4.0 acre.

This route segment would create long-term impacts on Farmland of Statewide Importance and Farmland of Unique Importance totaling 0.4 acre and 0.9 acre respectively. Short-term impacts would total 0.8 and 1.6 acre, respectively. However, moderate impacts would result because no farmland would be converted to non-agricultural use. Private grazing land may be affected by the construction of this route segment, but impacts would be low. Long-term impacts on undeveloped land would total 2.1 acres and short-term impacts would total 4.0 acres.

The Project would be in compliance with the Yakima County Comprehensive Plan and all applicable development regulations.

Moderate impacts would occur for 1.0 mile of this route segment.

4.4.4.5 Route Segment 2b

Long-term impacts would be created in undeveloped/grazing land use areas. A total of 35.7 acres of long-term impact and 59.6 acres of short-term impact would be created as a result of Route Segment 2b.

The route segment also crosses U.S. Bureau of Land Management (BLM) grazing allotments, where long-term impacts would total 1.6 acres of lease land. Short-term lease land impacts would total 2.5 acres.

This route segment crosses Farmland of Statewide Importance, Farmland of Unique Importance, and Prime Farmland if Irrigated land causing 10.2 acres of long-term disturbance. However, this is non-agricultural land, so impacts would be low.

CRP lands would also be affected by this route segment. In Public Land Survey System (PLSS) sections crossed known to have CRP designated lands, long-term impacts totaling 4.8 acres could potentially occur (see Table 4.4-4 Potential Long-Term Disturbance to CRP Lands by Route Segment). However, the location of these lands within the section crossed is unknown. CRP lands to be crossed by the transmission line would need a Farm Service Agency (FSA) assessment of the adverse effects on the participants CRP acreage. As stated in Section 3.4, the exact parcels of CRP lands are not known. Pacific Power will consult with the FSA and landowners to determine if the construction of the Project would affect the CRP status of the land or if special construction or re-vegetation would be necessary. Pacific Power will provide landowners with information, including estimated land disturbance to ground cover and length of use, if required to obtain prior approval from the FSA for ground disturbance prior to ground disturbance on CRP lands.

If the FSA determines that the use will have an adverse effect on CRP acreage, the affected acreage will be terminated and refunds assessed. Annual lease payments to CRP enrollees, however, are not likely to be reduced, despite the potential for long-term disturbance and reduction of CRP acres due to the presence of structure footprints and access roads. Therefore, moderate impacts on CRP lands are expected. The FSA Handbook Agricultural Resource Conservation Program for State and County Offices (USDA 2008) states:

> *"The following is the procedure for continuing CRP-1 on land being used by public utilities for installing gas lines, pipes, cable, telephone poles, etc., materials used by an entity of the State for building or Federally funded pipeline projects.*
>
> *CRP-1's may be continued without reduction in payment if:*
>
> - *the participant gives COC details of the proposed use, including length of use*
> - *COC authorizes use*
>
>   *Note: Use is not authorized during primary nesting season.*
> - *NRCS (Natural Resource Conservation Service) or TSP (Technical Service Provider)certifies usage will have a minimal effect, such as:*
>   - *Erosion is kept to minimum*
>   - *Minimum effect on wildlife and wildlife habitat*
>   - *Minimum effect on water and air quality*
> - *the participant restores cover, at the participant's expense, to disturbed land in timeframe set by COC.*
>
>   *Note: No payment reduction will be made for compensation received by the participant from the public agency.*
>
> *NRCS or TSP will determine whether the disturbance will have an adverse effect on the land. If the NRCS or TSP determines that public use will have an adverse effect on CRP acreage, affected acreages shall be terminated and refunds assessed."*

The Project would be in compliance with the Yakima County Comprehensive Plan (2007) and all applicable development regulations, and the BLM Spokane District 1985/1987 RMP and 1992 RMP Amendment/ROD.

Moderate impacts would occur for 6.7 miles of this route segment.

4.4.4.6 Route Segment 2c (Agency Preferred Alternative)

See discussion regarding short-term construction impacts, Prime Farmlands, loss of agricultural and grazing land due to structure footprints, potential financial impacts, impacts on aerial spraying, GPS operation, and other general short-term and long-term impacts on agricultural and grazing lands as described in Section 4.4.4.3 Route Segment 1c. Short-term impacts would occur on 13.1 acres of irrigated cropland for this segment.

A portion (8.6 miles of 18.1 miles) of this route segment parallels an existing utility ROW located on private lands. A portion of the route segment that parallels the exiting utility corridor would also be located in irrigated agricultural land and, potentially, CRP lands. Approximately 2.5 acres of long-term disturbance would occur in irrigated agricultural land and 3.5 acres of long-term disturbance would occur in CRP Land. Long-term disturbance would occur to cropland under cultivation as wheat, Timothy, apple, alfalfa hay and wildlife feed. Table 4.4-5 shows long-term disturbance to crop types resulting from Route Segment 2c. Most of this agricultural land (80 percent) is Farmland of Statewide Importance, Farmland of Unique Importance, and/or Prime Farmland if Irrigated, and these lands would be converted to non-agricultural uses. Other non-agricultural land is designated as Prime and Unique Farmland or Farmland of Statewide importance, also. Table 4.4-3 shows long-term disturbance to Prime Farmland by route segment. Conversion of Prime Farmlands to non-agricultural uses would require a Farmland Conversion Impact Rating from the U.S. Department of Agriculture.

The operation of five center pivot irrigation systems would be impacted as a result of the presence of this route segment. The Project would cause long-term impacts on 1.0 acre of center pivot agricultural areas and less than 0.1 acre of sprinkler irrigated land. Conflicts with agricultural operations associated with facilities located at MP 11.0 will cause high impacts.

CRP lands would also be affected by this route segment. Long-term impacts totaling 0.4 acre would occur to known CRP lands. In PLSS sections crossed known to have CRP designated lands, long-term impacts totaling 3.5 acres could potentially occur. However, the location of these lands within the section crossed is unknown. CRP lands will be crossed by the transmission line would need an FSA assessment of the adverse effects on the participants CRP acreage. If the FSA determines that the use will have an adverse effect on CRP acreage, the affected acreage will be terminated and refunds assessed. See other CRP land impact discussion in Section 4.4.4.5 Route Segment 2b. As stated in Section 3.4, the exact parcels of CRP lands are not known. Pacific Power will consult with the FSA and landowners to determine if the construction of the Project would affect the CRP status of the land or if special construction or revegetation would be necessary. Pacific Power will provide landowners with information, including estimated land disturbance to ground cover and length of use, if required to obtain prior approval from the FSA for ground disturbance prior to ground disturbance on CRP lands. Annual lease payments to CRP enrollees are not likely to be reduced, despite the potential for long-term disturbance and reduction of CRP acres due to the presence of structure footprints and access roads, and therefore, moderate impacts are assumed.

State grazing lease lands would also be affected by the construction of this route segment. Long-term impacts would occur on 0.7 acre of state grazing lease lands. Long-term impacts totaling 1.4 acres of BLM grazing lease allotments would also occur along this segment.

Non-irrigated fallow wheat agricultural land would also be affected by this route segment between MP 9.5 and MP 9.6 and wildlife feed crops between MP 13.1 and 13.7. Long-term dryland impacts total 4.2 acres and short-term impacts total 0.8 acres for this route segment.

The Project would be in compliance with the Yakima County Comprehensive Plan and all applicable development regulations.

High impacts would occur for 2.9 miles and moderate impacts would occur for 12.7 miles of this route segment.

4.4.4.7 Route Segment 2d (Agency Preferred Alternative)

Long-term land use impacts occurring as a result of the construction or Route Segment 2d will primarily be to BLM grazing lease lands. A total of 1.4 acres of long-term impacts and 2.6 acres of short-term impacts will occur for this route segment.

Prime Farmland impacts will also occur in non-agricultural areas. Long-term impacts will occur on 4.5 acres of Farmland of Unique Importance, and 8.2 acres of short-term impacts will occur.

CRP lands would also be affected by this route segment. In PLSS sections crossed known to have CRP designated lands, long-term impacts totaling 0.3 acre could potentially occur. However, the location of these lands within the section crossed is unknown. CRP lands will be crossed by the transmission line would need an FSA assessment of the adverse effects on the participants CRP acreage. See other CRP land impact discussion in Section 4.4.4.5 Route Segment 2b. As stated in Section 3.4, the exact parcels of CRP lands are not known. Pacific Power will consult with the FSA and landowners to determine if the construction of the Project would affect the CRP status of the land or if special construction or revegetation would be necessary. Pacific Power will provide landowners with information, including estimated land disturbance to ground cover and length of use, if required to obtain prior approval from the FSA for ground disturbance prior to ground disturbance on CRP lands.

The Project would be in compliance with the Yakima County Comprehensive Plan (2007) and all applicable development regulations, Benton County Comprehensive Plan (2006), and the Spokane District 1985/1987 RMP and 1992 RMP Amendment/ROD.

Moderate impacts would occur for 4.3 miles and low impacts would occur for 2.4 miles of this route segment.

4.4.4.8 Route Segment 3a (Agency Preferred Alternative)

This route segment is located adjacent to the Vantage Substation along the existing utility corridors. Land use impacts would be low for this route segment.

4.4.4.9 Route Segment 3b

See discussion regarding short-term construction impacts, Prime Farmlands, loss of agricultural and grazing land due to structure footprints, potential financial impact, impacts on aerial spraying, GPS operation, and other general short-term and long-term impacts on agricultural and grazing lands as described in Section 4.4.4.3 Route Segment 1c. Short-term impacts would total 49.0 acres on military lands for this segment.

No direct or high impacts are anticipated in this route segment. During ROW acquisition and detailed design, the assumed centerline of this route segment would be adjusted to avoid the need for removal of dwellings or related structures from the transmission line ROW. Therefore with prudent adjustments to the location of the route, ROW and structure placement no direct impacts to existing dwellings or related structures are foreseen. Moderate impacts would result from long-term elimination or limitation of any structure placement or development under the transmission line within the ROW.

Route Segment 3b would cause approximately 20.1 acres of long-term impacts on military land use on the perimeter of the JBLM YTC in Training Areas 5 and 6. Military operations in this area would be minimally affected, however, because the Project would be on the perimeter of training activity areas and transmission line structures would be located adjacent to an existing fire break road. Impacts would be moderate, because activities could continue to occur.

Non-agricultural Prime Farmland would be affected by this route segment. Long-term impacts would occur to Farmland of Unique Importance, Farmland of Statewide Importance, and Prime Farmland if Irrigated totaling 7.6, 1.1 and 0.6 acre, respectively (refer to Table 4.4-3).

Potential impacts would also occur where the Project parallels and crosses the John Wayne Pioneer Trail between MP 17.3 and 19.0, where the Project would potentially conflict with the use of the trail. The existing ROW for the trail (railroad corridor), where the Project would be located within this corridor, is 200 feet. High impact would occur as a result of potential conversion of recreational land to non-recreational uses (transmission line structures) (also see Section 4.5: Recreation).

Short-term impacts would occur on Huntzinger Road and State Route (SR) 243, where road users would be affected by disruption of traffic flow during construction (see Section 4.7: Transportation).

The Project would be in compliance with the Yakima County Comprehensive Plan (2007) and all applicable development regulations, the Kittitas County Comprehensive Plan (2010), and the Spokane District 1985/1987 RMP and 1992 RMP Amendment/ROD.

Overall, high impacts would total 1.7 miles and moderate impacts would total 5.2 miles for this route segment.

4.4.4.10 Route Segment 3c (Agency Preferred Alternative)

See discussion regarding short-term construction impacts, Prime Farmlands, loss of agricultural and grazing land due to structure footprints, potential financial impacts, impacts on aerial spraying, GPS operation, and other general short-term and long-term impacts on agricultural and grazing lands as described in Section 4.4.4.3 Route Segment 1c. Short term impacts would occur on 60.1 acres of undeveloped/grazing lands and 33.5 acres of irrigated cropland.

A portion (4.0 miles of 25.0 miles) of this route segment parallels the Hanford-Vantage #1 500 kV transmission line corridor with 3.4 miles being in a BLM designated utility corridor located within the Saddle Mountains Management Area (Saddle Mountains MA). A portion of the route segment that parallels the existing utility corridor is located in an open road designation within the Saddle Mountains MA (1.8 miles, see Section 4.7: Transportation). Approximately 1.6 miles located within the Saddle Mountains MA and utility corridor is located in a road restricted area. Most of the BLM land in the Saddle Mountains MA is under grazing leases, and long-term impacts on these lands would total 5.7 acres (see Table 4.4-2). BLM oil and gas lease land would also be affected by the Project, with 0.6 acres of long-term disturbance occurring as a result of this route segment. Rangeland and recreational use impacts would be low because the grazing would continue on these lands and off-road vehicles would be able to move under and around the transmission line structures. Moderate impacts to land used for residential purposes would occur at MP 10.3 to 10.4, MP 23.6-23.7, and MP 22.5-22.5 and MP 23.7-23.8.

EDP Renewables has secured wind testing and monitoring ROW in the Saddle Mountains as part of the proposed Saddle Mountains West Wind Farm in the Project area. The Project would cross a portion of these lease lands in the Saddle Mountains MA, and the entire length of the Project in the Saddle Mountains MA would be in the wind testing and monitoring ROW. Moderate impacts could result from the Project by limiting the potential placement of wind turbines in two areas on the north end and south end of the Saddle Mountains MA where the Project diverges from the Hanford-Vantage #1 line and because the presence of the Project could potentially affect interconnection of the wind farm collector to the existing line (also see Section 4.17: Cumulative Impacts).

Approximately 6.2 acres of long-term impacts would occur to irrigated agricultural lands almost entirely in the Wahluke Slope area. A small area of irrigated agricultural land would be affected by the Project north of the Saddle Mountains. Long-term disturbance would occur to cropland cultivated as alfalfa hay, blueberry, cherry, field corn, wine grape, grass hay, green pea, potato, timothy, and wheat. Table 4.4-6 summarizes impacts to crop types that would occur as a result of the construction of Route Segment 3c.

All of these crops are irrigated and are Prime Farmland and/or Statewide Important agricultural areas. Table 4.4-3 shows long-term disturbance to Prime Farmland by route segment. Prime Farmland makes up 100 percent of the total farmland crossed by this route segment.

Short-term impacts totaling 33.5 acres would occur to these irrigated crop lands. Long-term impacts would occur to cherry orchards totaling 0.4 acre along 0.3 mile of line route. Growers occasionally utilize helicopters to dry the orchards when precipitation and low temperature endanger crops due to potential freezing. The presence of the Project in the area of cherry orchards (MP 6.7, 10.3, 10.7, 12.3) could affect the operations of cherry growers and create air-space obstructions where none currently occur.

The operation of nine center pivot irrigation systems would be affected along this route segment for a distance of 0.9 mile; however, all utilize articulated pivot systems. In these areas, the irrigation system would not need to be modified to accommodate structures should they be necessary within pivot irrigated field. Other long-term impacts would occur in areas where hand-movable sprinkler and other (unknown) systems are utilized, potentially creating higher operating costs as a result of system re-configuration.

This route segment would also potentially conflict with the operation of irrigation canals operated by the U.S. Bureau of Reclamation (Reclamation). The Project would need to be located on the west side of Road N SW to allow for the maintenance and access of the open ditch canals from the road. Buried canals would need to be located during detailed Project engineering and planning to ensure that the buried lines are not affected during auguring for foundation construction or direct imbedding of structures. Wasteway lines, lateral lines and waterway lines are located between MP 5.8-6.3, MP 6.8-7.8, MP 11.2-11.7, and MP 11.4-11.5, and are crossed at MP 10.3, 10.8, 12.3, and 12.6 (see Appendix A: Existing Agriculture and Irrigation Map).

BLM grazing lease lands would also be affected by the construction of this route segment. Long-term impacts would occur on 5.7 acres of BLM lease lands located in the Saddle Mountains MA.

Potential impacts on open off-highway vehicle (OHV) areas of the Saddle Mountains MA, Beverly Sand Dunes OHV Area, and Burkett Lake Recreation Area would occur. See Section 4.5: Recreation for a detailed discussion of impacts.

Low impacts would also occur on the private air strip and associated aircraft operations. The Project would not penetrate the approach zone of the airport. The addition of a transmission line in the vicinity will not affect normal air strip operations.

The Project would be in compliance with the Benton County Comprehensive Land Use Plan, the Grant County Comprehensive Plan, and the Spokane District 1985/1987 RMP and 1992 RMP Amendment/ROD. The Saddle Mountains MA is managed for multiple uses such as mineral extraction, rangeland, recreation, wildlife habitat, and energy ROWs.

Overall, high impacts would total 4.6 miles and moderate impacts would total 13.4 miles for Route Segment 3c.

TABLE 4.4-2 LONG-TERM DISTURBANCE TO LAND USE AND MANAGEMENT BY ROUTE SEGMENT (ACRES)

ROUTE SEGMENT	LAND USE OR MANAGEMENT AREA (ACRES OF LONG-TERM DISTURBANCE)									
	RESIDENTIAL	IRRIGATED AGRICULTURE	DRYLAND AGRICULTURE	MILITARY (JBLM YTC)[1]	GRAVEL MINING	RECREATION/ CONSERVATION	STATE GRAZING LEASE	BLM GRAZING LEASE	BLM OIL/GAS LEASE	UNDEVELOPED[2]
1a* 2.2 miles	1.8	0	0	0	0	0	0	0	0	0
1b* 12.5 miles	0	0	0	11.2	0	0	0	0	0	0.1
1c 12.9 miles	19.0	0.3	1.5	0	0	0	0	0	0	3.8
2a* 1.0 mile	0	0	0	0	0	0	0	0	0	2.1
2b 16.4 miles	0	0	7.6	0	0	0	0	1.6	0	35.7
2c* 18.1 miles	0	2.5	14.4	0	0	0	0.7	1.4	0	20.2
2d* 7.0 miles	0	0	0.8	0	0	0	0	0	0	15.3
3a* 0.1 mile	0	0	0	0	0	0	0	0	0	0.1
3b 21.7 miles	0	0	0	20.1	0	0	0	0	0.8	9.9
3c* 25.4 miles	0	6.2	0	0	<0.1	0.1	0	5.7	0.6	19.8

[1]Based on Access Model "A". See Section 2.4.3.2. [2]May include private grazing land. *Route segments that comprise the Agency Preferred Alternative.

TABLE 4.4-3 LONG-TERM DISTURBANCE TO PRIME FARMLAND BY ROUTE SEGMENT (ACRES)

PRIME FARMLAND TYPE	ROUTE SEGMENT (ACRES OF LONG-TERM DISTURBANCE)									
	1a*	1b*	1c	2a*	2b	2c*	2d*	3a*	3b	3c*
Farmland of statewide importance	0.1	1.8	0	0.4	0.6	3.1	0	0	7.6	2.5
Farmland of unique importance	1.4	0	0.1	0.9	8.5	7.7	4.5	0	1.1	6.6
Not prime farmland	0.3	4.9	23.0	0.8	25.5	10.8	9.9	0.2	21.7	11.9
Prime farmland if irrigated	<0.1	4.6	0	0	1.1	1.1	0	0	0.6	0.8

*Route segments that comprise the Agency Preferred Alternative.

TABLE 4.4-4 POTENTIAL LONG-TERM DISTURBANCE TO CROP LAND BY ROUTE SEGMENT (ACRES)

FARMLAND TYPE	ROUTE SEGMENT (ACRES OF LONG-TERM DISTURBANCE)									
	1a*	1b*	1c	2a*	2b	2c*	2d*	3a*	3b	3c*
Known CRP Land	0	0	0	0	0	0.4	0	0	0	0
CRP Land Potentially Disturbed[1]	0	0	0	0	4.8	3.5	0.3	0	0	0

[1]CRP is located in PLSS Section crossed by Route Segment, but the exact location within the section is unknown.
*Route segments that comprise the Agency Preferred Alternative.

TABLE 4.4-5 LONG-TERM DISTURBANCE TO CROPS BY ROUTE SEGMENT

ROUTE SEGMENT	CROP TYPE IMPACTS (LINEAR MILES CROSSED AND ACRES DISTURBED BY TOTAL ROUTE SEGMENT)[1]													
	ALFALFA HAY		APPLE		BLUEBERRY		CHERRY		FALLOW		FIELD CORN		GRAPE (WINE)	
	mi	ac	mi	ac	mi	ac	mi	ac	mi	ac	mi	ac	mi	ac
1a* 2.2 miles	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1b* 12.5 miles	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1c 12.9 miles	0	0	0.2	0.2	0	0	0	0	<0.1	<0.1	0	0	0	0
2a* 1.0 mile	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2b 16.4 miles	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2c* 18.1 miles	0.4	0.5	0	<0.1	0	0	0	0	0	0	0	0	0	0
2d* 7.0 miles	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3a* 0.1 mile	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3b 21.7 miles	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3c* 25.4 miles	<0.1	>0.1	0	0	<0.1	<0.01	0.3	0.4	0	0	<0.1	0.1	1.5	1.4

Notes: [1]Miles crossed (mi) = inventory measurement; Acres (ac) = amount of long-term disturbance. [2]Total long-term disturbance to crop does not include disturbance to undeveloped land, cliff/rock, or water. Acres of short-term disturbance are presented in the discussion section for each route segment.
*Route segments that comprise the Agency Preferred Alternative.

TABLE 4.4-6 LONG-TERM DISTURBANCE TO CROPS BY ROUTE SEGMENT

ROUTE SEGMENT	CROP TYPE IMPACTS (LINEAR MILES CROSSED AND ACRES DISTURBED BY TOTAL ROUTE SEGMENT)[1]													
	GRASS HAY		GREEN PEA		POTATO		TIMOTHY		WHEAT		WHEAT, FALLOW		WILDLIFE FEED	
	mi	ac	mi	ac	mi	ac	mi	ac	mi	ac	mi	ac	mi	ac
1a* 2.2 miles	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1b* 12.5 miles	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1c 12.9 miles	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2a* 1.0 mile	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2b 16.4 miles	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2c* 18.1 miles	0	0	0	0	0	0	0.5	0.5	0.1	<0.1	0.5	0.3	0.5	0.4
2d* 7.0 miles	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3a* 0.1 mile	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3b 21.7 miles	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3c* 25.4 miles	<0.1	0.1	0.2	0.1	0.2	0.2	<0.1	<0.1	0.5	0.5	0	0	0	0

Notes: [1]Miles crossed (mi) = inventory measurement; Acres (ac) = amount of long-term disturbance. [2]Total long-term disturbance to crop does not include disturbance to undeveloped land, cliff/rock, or water. Acres of short-term disturbance are presented in the discussion section for each route segment.
*Route segments that comprise the Agency Preferred Alternative.

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TABLE 4.4-7 LONG-TERM DISTURBANCE TO IRRIGATED CROPLAND BY ROUTE SEGMENT

ROUTE SEGMENT	IRRIGATED CROPLAND	
	DISTANCE CROSSED (MILES)	AREA DISTURBED (ACRES)
1a* 2.2 miles	0	0
1b* 12.5 miles	0	0
1c 12.9 miles	0.4	0.3
2a* 1.0 mile	0	0
2b 16.4 miles	0	0
2c* 18.1 miles	0.9	2.5
2d* 7.0 miles	0	0
3a* 0.1 mile	0	0
3b 21.7 miles	0	0
3c* 25.4 miles	2.7	1.3

*Route segments that comprise the Agency Preferred Alternative.

4.4.5 Mitigation Measures

The following mitigation measures have been identified to reduce, avoid, minimize or rectify adverse impacts to land use resources. These mitigation measures would be implemented where warranted and are anticipated to be effective. They are summarized in Table 4.4-8 below.

TABLE 4.4-8 VANTAGE-POMONA HEIGHTS TRANSMISSION PROJECT MITIGATION MEASURES

MITIGATION MEASURE	DESCRIPTION
LU-1: Modify Structure/ROW Location	Within the standard limits of structure design, single pole and H-frame structures will be located so as to allow adequate clearance for agricultural operations and irrigation canal maintenance, or to span or avoid sensitive land use features. Avoidance measures may include structure micro-siting, placing access roads and structures at the edge of fields, spanning features, taller structures, or the realigning of access roads and ROW centerline.
LU-2: Modify Structure Type	To the extent practical, within standard structure design, and where not identified as a project design feature, single-pole structures will be utilized to minimize ground disturbance and operational conflicts and address site-specific constraints
LU-3: Stockpile Soils in Prime Farmland	Any topsoil removed from areas designated as prime farmland or farmland of Farmland of Statewide Importance will be scraped and stockpiled rather than covered over or removed. The topsoil will then be used for erosion control and in areas of planting for best management practices.

4.4.6 Residual Impacts By All Route Segments

To minimize potential adverse impacts to land use, selective mitigation measures described above would be implemented. Residual impacts for all of the route segments are presented in Table 4.4-9.

To minimize the effects of Project construction and operation conflicts with sensitive land uses, mitigation measure LU-1: Modify Structure/ROW Location will be implemented in specific locations as necessary. Mitigation measure LU-1 will be effective at reducing impacts by reducing the potential operational and maintenance interference and other conflicts. This mitigation measure will be implemented in the following locations:

- Route Segment 1a: MP 1.7-1.8
- Route Segment 1c: MP 5.9-6.0, 9.5-10.5, 11.3-11.4
- Route Segment 2c: MP 9.5-11.2, 13.1-14.7
- Route Segment 3b: MP 14.7-15.1, 17.3-19.0
- Route Segment 3c: MP 5.3-14.3

To minimize the effects of structure impedance on irrigation facilities and cropland, Mitigation Measure LU-2: Modify Structure Type will be implemented in specific locations as necessary. Mitigation Measure LU-2 will be effective at reducing impacts by reducing the structure footprint area and increasing compatibility with agricultural operations. This mitigation measure will be implemented in the following locations:

- Route Segment 2c: MP 13.1-14.7

To minimize the effects farmland conversion and impacts on Prime Farmland, mitigation measure LU-3: Stockpile Soils in Prime Farmland will be implemented in specific locations as necessary. Mitigation Measure LU-3 will be effective at reducing impacts by preserving soil resources and minimizing the effects of reduced Prime Farmland area. This mitigation measure would reduce impacts from moderate to low in non-agricultural land. This mitigation measure will be implemented in the following locations:

- Route Segment 1a: MP 0.1-2.2
- Route Segment 1b: MP 0.0-0.2, 5.4-5.8, 6.4-6.8, 9.3-9.5, 10.0-10.2, 10.6-11.2
- Route Segment 1c: MP 0.0-0.1, 10.5-10.7
- Route Segment 2a: MP 0.0-1.0
- Route Segment 2b: MP 0.0-2.2, 2.4-2.5, 4.9-5.0, 5.9-6.1, 6.5-6.8, 7.0-7.6, 11.1-11.7, 15.0-16.4
- Route Segment 2c: MP 0.0-0.1, 0.3-2.9, 3.3-3.7, 5.2-6.1, 6.3-7.2, 7.5-7.9, 8.0-9.5, 10.2-10.4, 11.1-12.9, 13.2-14.0, 14.4-17.1, 17.7-18.2
- Route Segment 2d: MP 0.0-0.3, 0.6-1.0, 1.7-2.0, 2.3-5.1, 5.6-6.0, 6.4-7.0
- Route Segment 3b: MP 3.0-3.7, 5.2-8.4, 10.6-10.8, 15.7-15.8, 18.1-19.6
- Route Segment 3c: MP 0.0-2.4, 2.9-3.4, 3.8-3.9, 4.8-10.4, 10.6-11.6, 11.9-12.5, 12.7-13.0, 13.8-15.1, 15.4-15.5, 16.7-16.9, 17.4-17.5, 18.0-18.3, 18.5-18.7, 20.5-21.1, 21.7-22.5, 22.8-24.1

TABLE 4.4-9 PROJECT RESIDUAL IMPACTS ON LAND USE BY ROUTE SEGMENT (MILES)

ROUTE SEGMENT	RESIDUAL IMPACT			
	NO IMPACT	LOW	MODERATE	HIGH
1a* 2.2 miles	0.3	0	2.0	0
1b* 12.5 miles	0	0	12.6	0
1c 12.9 miles	1.1	9.7	2.1	0.1
2a* 1.0 mile	0	1.0	0	0
2b 16.4 miles	0	16.4	0	0
2c* 18.1 miles	0	15.2	2.5	0.5

ROUTE SEGMENT	RESIDUAL IMPACT			
	NO IMPACT	LOW	MODERATE	HIGH
2d* 7.0 miles	0.3	6.8	0	0
3a* 0.1 mile	0	0.2	0	0
3b 21.7 miles	2.0	18.1	1.7	0
3c* 25.4 miles	2.7	15.9	6.3	0.4

*Route segments that comprise the Agency Preferred Alternative.

4.4.7 Impact Summary By Alternative

4.4.7.1 No Action

Under the No Action Alternative, the proposed Project would not be constructed or operated. No Project-related impacts to land use would occur.

4.4.7.2 Route Alternatives

Table 4.4-10 presents a summary of the long-term impacts for each of the end-to-end alternatives and residual impact levels following the implementation of mitigation measures.

Long-term disturbance to land uses range from zero acres to 28.8 acres for the Project alternatives. Alternatives E, F, G and H would have the greatest impact on residential land uses (20.8 acres of long-term disturbance) and Alternatives A, B, C and D (Agency Preferred Alternative) would have the least (1.8 acres) of long-term disturbance. Alternative H would have the greatest impact on irrigated and dryland agriculture (9.1 acres and 16.7 acres of long-term disturbance on irrigated and dryland agriculture, respectively) and Alternative B would have the least impact on irrigated and dryland agriculture (0 acres and 8.4 acres of long-term disturbance). Alternatives B and C would have the greatest impacts (31.2 acres of long-term disturbance) on military lands (JBLM YTC), and Alternatives F and H would have the least (0 acres of long-term disturbance). State grazing leases would be most affected under Alternatives C, D (Agency Preferred Alternative), G and H (0.9 acre of long-term disturbance) and would not be affected under Alternatives A, B, E, and F. BLM grazing leases would be most affected under Alternatives A and F (8.7 acres of long-term disturbance), and least affected under Alternatives C and G (1.4 acres of long-term disturbance). Overall, Alternative H would have the greatest mileage of high impacts on land uses (1.0 miles) and Alternative B would have the least (0 miles). Alternative D (Agency Preferred Alternative) would have the highest mileage of moderate land use impacts (23.4 miles) and Alternative E would have the least (5.8 miles).

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TABLE 4.4-10 LONG-TERM LAND USE DISTURBANCE AND ALTERNATIVE RESIDUAL IMPACT SUMMARY

ALTERNATIVE	LAND USE OR MANAGEMENT AREA (ACRES OF LONG-TERM DISTURBANCE)						RESIDUAL IMPACTS (MILES)			
	RESIDENTIAL	IRRIGATED AGRICULTURE	DRYLAND AGRICULTURE	MILITARY (JBLM YTC)	STATE GRAZING /IRRIGATED AGRICULTURE LEASE	BLM GRAZING LEASE	HIGH	MODERATE	LOW	NO IDENTIFIABLE
Alternative A 1a, 1b, 2a, 2b, 2d, 3a, 3c 64.5 miles	1.8	6.2	8.4	11.2	0	8.7	0.4	20.9	39.9	3.3
Alternative B 1a, 1b, 2a, 2b, 2d, 3a, 3b 61.0 miles	1.8	0	8.4	31.2	0	3.0	0	16.3	42.1	2.6
Alternative C 1a, 1b, 2a, 2c, 2d, 3a, 3b 62.8 miles	1.8	2.5	15.2	31.2	0.9	1.4	0.5	18.8	40.9	2.6
Alternative D (Agency Preferred Alternative) 1a, 1b, 2a, 2c, 2d, 3a, 3c 66.3 miles	1.8	8.7	15.2	11.2	0.9	7.1	0.9	23.4	38.7	3.3
Alternative E 1a, 1c, 2a, 2b, 2d, 3a, 3b 61.4 miles	20.8	0.3	9.9	20.1	0	3.0	0.1	5.8	51.8	3.7
Alternative F 1a, 1c, 2a, 2b, 2d, 3a, 3c 64.9 miles	20.8	6.6	9.9	0	0	8.7	0.5	10.4	49.6	4.4
Alternative G 1a, 1c, 2a, 2c, 2d, 3a, 3b 63.2 miles	20.8	2.8	16.7	20.1	0.9	1.4	0.6	8.3	50.6	3.7

ALTERNATIVE	LAND USE OR MANAGEMENT AREA (ACRES OF LONG-TERM DISTURBANCE)						RESIDUAL IMPACTS (MILES)			
	RESIDENTIAL	IRRIGATED AGRICULTURE	DRYLAND AGRICULTURE	MILITARY (JBLM YTC)	STATE GRAZING /IRRIGATED AGRICULTURE LEASE	BLM GRAZING LEASE	HIGH	MODERATE	LOW	NO IDENTIFIABLE
Alternative H 1a, 1c, 2a, 2c, 2d, 3a, 3c 66.7 miles	20.8	9.1	16.7	0	0.9	7.1	1.0	12.9	48.4	4.4

4.5 RECREATION

Recreation resource impacts would be created as a result of the construction, operation and maintenance of the Project, and would be caused by the displacement or alteration of existing recreation land uses or activities.

4.5.1 Methods and Impact Types

4.5.1.1 Analysis Methods

The recreation impact methodology was similar to land use resources, and included:

- Identifying the types of Project effects on recreation resources;
- Evaluating the sensitivity of specific recreational uses to change;
- Developing criteria for assessing impact intensity;
- Assessing impacts based on project design features;
- Introducing mitigation measures in specific locations to reduce impacts;
- Evaluating residual impacts; and
- Comparing alternatives based on recreation impacts.

4.5.1.2 Impact Criteria

Resource sensitivity was considered in determining how susceptible to change recreational land uses would be to the introduction of the Project transmission line. Recreation impacts were based on sensitivity and impacts that could occur to recreational uses as a result of Project construction.

Sensitivity is a measure of the probable responses that a recreational use or activity would have to the direct and indirect impacts associated with the construction and operation of the proposed transmission line. Refer to Table 4.5-1 for recreational resource sensitivity.

Potential change describes the physical, operational or social changes that could potentially occur to a recreation use or activity. Changes are brought about by:

- Acquisition of land or property rights to accommodate the transmission line;
- Installing the transmission line;
- Te physical presence and operation of the transmission line; and
- Managing the right-of-way (ROW) and maintaining the transmission line.

The potential for change from introducing the transmission line differs from one recreation use category to another with respect to what might be altered and to what extent. This potential for change is predicted evaluating the environmental conditions, the Project description, and project design features.

TABLE 4.5-1 RECREATION RESOURCE SENSITIVITY CLASSIFICATION

RECREATION RESOURCE	SENSITIVITY
Developed Recreation Facilities	High
Trails	High
Planned Recreation Facilities and Trails	Moderate
Public and Private Hunting Areas	Low
Dispersed Recreation Areas	Low

4.5.1.3 Impact Types

Physical impacts to recreational uses were assessed along the centerline of each of the route segments for the inventoried recreational use categories. The impact types identified for recreation uses along the centerlines of alternative route segments are characteristically direct and long-term, and include any impact that:

- Displaces, alters, or otherwise physically affects any existing, developing or planned recreational use or activity; and
- Alters or otherwise physically affects any established, designated or planned park, recreation, preservation, or educational use area or activity.

Visual impacts are typically an important aspect of the recreational experience, and are discussed in Section 4.8 Visual Resources, and are not part of the recreational resource impact analysis.

4.5.2 Impact Levels (High, Moderate, Low, No Identifiable Impact)

Potential impacts to recreation resources were assessed along the assumed centerline of the proposed 230 kilovolt (kV) transmission line and access roads. The assumed centerline for land use and recreation impact assessment is 125 feet wide (i.e., the proposed ROW width).

High
Impacts would be considered high where the Project would:

- Permanently preclude, alter or eliminate developed recreational activities during and after construction of transmission lines or access roads.

Moderate
Impacts would be considered moderate where the Project would:

- Temporarily preclude or limit developed and dispersed recreation opportunities during peak use periods, during construction of transmission line and/or access roads.

Low
Impacts would be considered low where the Project would:

- Temporarily preclude or limit developed and dispersed recreation opportunities during off-peak use periods during construction of transmission line and/or access roads; and/or
- Require minor relocation of dispersed recreational activities to equal or better locations during or after construction of transmission line and/or access roads.

No identifiable impact would occur where recreation uses would be able to continue as they currently exist.

4.5.3 Impacts Common to All Route Segments

The proposed Project would potentially affect hunting on public and private lands across all route segments. Specific hunting locations are not known, but impacts would be similar across all route segments because the activity occurs throughout the Project area.

During construction, noise from construction vehicles, equipment and helicopters could displace wildlife to other areas not accessible for hunting. The displacement of wildlife from these areas would result in a diminished hunting experience, but may be offset by wildlife displacement to other hunting areas. Loss of game habitat would be minimal (see Section 4.3 Wildlife and Special Status Species). Construction impacts would be short-term and related to structure installation, staging areas, access road improvements and new access road construction, and temporary pulling/tensioning sites, and are expected to be low.

4.5.4 Impacts Specific to Route Segments

Long-term and short-term impacts to recreation resources were assessed for each route segment and are presented in Table 4.5-2. Impacts for each route segment are discussed in detail in the following sections.

4.5.4.1 Route Segment 1a (Agency Preferred Alternative)

There are no recreation areas or significant recreational activities occurring along Route Segment 1a, therefore no short-term or long-term impacts will occur as a result of the Project construction, operation or maintenance. No impacts on recreation resources are expected.

4.5.4.2 Route Segment 1b (Agency Preferred Alternative)

Route Segment 1b is located in a restricted area of Joint Base Lewis-McChord Yakima Training Center (JBLM YTC), and no recreation activities are allowed in this area of the base. No impacts on recreation resources are expected.

4.5.4.3 Route Segment 1c

The primary recreation activity occurring in this area is private land hunting. State lands are crossed for one mile on the west end of the route in the Blackrock designated elk hunting area (WDFW 2011). Refer to impacts common to all route segments above (Section 4.5.3) for potential recreation impacts on Route Segment 1c. Other areas of agriculture and residential land use will not impact recreational resources. Low impacts are expected for 11.0 miles of this route segment, and no impacts for 1.8 miles.

4.5.4.4 Route Segment 2a (Agency Preferred Alternative)

Route 2a crosses private lands potentially open for dispersed hunting activities. Refer to impacts common to all route segments above (Section 4.5.3) for potential recreation impacts on Route Segment 2a. Low impacts are expected for this route segment.

4.5.4.5 Route Segment 2b

Private and U.S. Bureau of Land Management (BLM) land potentially open for hunting may be affected by the Project. Refer to impacts common to all route segments above (Section 4.5.3) for potential recreation impacts on Route Segment 2b. Low impacts are expected for this route segment.

4.5.4.6 Route Segment 2c (Agency Preferred Alternative)

Private and BLM land potentially open for hunting may be affected by the Project. However, much of this route segment is located adjacent to an existing transmission line and agricultural land, limiting hunting opportunities and potential impacts. Refer to impacts common to all route segments above (Section 4.5.3) for potential recreation impacts on Route Segment 2c. Low impacts 11.6 miles and no impacts for 6.5 miles are expected for this route segment.

4.5.4.7 Route Segment 2d (Agency Preferred Alternative)

BLM land potentially open for hunting may be affected by the Project. However, limited access to these lands would reduce the potential for Project impacts. Refer to impacts common to all route segments above (Section 4.5.3) for potential recreation impacts on Route Segment 2d. Low impacts are expected for this route segment.

4.5.4.8 Route Segment 3a (Agency Preferred Alternative)

No impacts on recreational resources would occur for Route Segment 3a because this short segment is located in a utility corridor not used for recreation.

4.5.4.9 Route Segment 3b

Impacts would potentially occur to recreation resources as a result of constructing, operating, and maintaining the Project. These impacts would occur on recreationists using the Columbia River corridor, Priest Rapids Reservoir, and the John Wayne Pioneer Trail. The highest impacts would be related to the visual experience of users, and are covered in Section 4.8 Visual Resources. However, recreation resources associated with the John Wayne Pioneer Trail may be directly impacted in the long-term if the project displaces or converts a portion of the trail to non-recreation uses. Potential impacts would occur where the Project parallels and crosses the John Wayne Pioneer Trail between mile posts (MP) 17.3 and 19.0, where the Project would potentially conflict with the use of the trail. Short-term impacts related to the closure of the trail during construction may potentially affect trail users. Overall, high impacts would result from trail conversion to non-recreational uses. The existing ROW for the trail (railroad corridor), where the Project would be located within this corridor, is 200 feet. High impacts are expected for 1.7 mile, low impacts for 0.6 mile, and no impacts are expected for 19.4 miles of this route segment.

4.5.4.10 Route Segment 3c (Agency Preferred Alternative)

Potential impacts on open off-highway vehicles (OHV) areas of the Saddle Mountains Management Area (MA), the Saddle Mountains Private Hang Gliding Area, Beverly Sand Dunes OHV Area, and Burkett Lake Recreation Area would occur. Indirect impacts related to the road closures, restricted access and the visual affects of the transmission line (see Section 4.8 Visual Resources) would potentially occur.

Impacts on OHV users in the Saddle Mountains MA OHV would be low because riding areas are abundant and would remain. OHV users would be able to easily avoid the transmission line structures. Use may increase in these areas due to access established as a result of transmission line access road construction, and areas that might otherwise be difficult to traverse would be accessible. Other activities occurring in the Saddle Mountains MA, such as petrified wood collecting, hunting, horseback riding, mountain bike riding will be impacted at a low level and can continue as they currently occur.

Access to the Saddle Mountains Private Hang Gliding Area may be restricted during construction, causing short-term impacts on the site. Long-term impacts related to the alteration of gliding and landing patterns would also potentially occur. Gliders land in the Beverly Sand Dunes area in the Lower Crab Creek Valley below, and would likely alter their gliding and landing location due to the presence of the transmission line, causing low impacts due to minor dispersed activity displacement.

As described in Section 4.3, waterfowl injury and mortality could occur as a result of the Project, which may disrupt hunting activities if the project affects waterfowl use and potential hunting activities of the Lower Crab Creek area. However, there is very limited open water along Lower Crab Creek in the project area, and hunting generally is prohibited or would conflict with the other recreational activities occurring in the area (Beverly Sand Dunes OHV Park, Burkett Lake Recreation Area, John Wayne/Milwaukee Road Trail, etc.). In addition, there are four existing transmission lines traversing the Lower Crab Creek area between the Proposed Project and Priest Rapids Lake, where most of the wetlands and open water used by waterfowl occurs. Therefore, the Project is not expected to reduce waterfowl use of the area.

Crab Creek Corridor/Burkett Lake Recreation Area and Beverly Sand Dunes OHV Park impacts would be related to ground disturbing activities occurring in close proximity to the recreation areas. This route segment avoids crossing the planned expansion area of the Burkett Lake Recreation Area, but the proximity of the transmission line may impact the experience of some recreation users.

The Milwaukee Corridor impacts would be limited to visual effects because the trail is perpendicular to the transmission line and would be spanned, potentially causing only short-term impacts during construction.

Route Segment 3c also crosses the Columbia River recreational corridor utilized for rafting, fishing, boating, and sight-seeing. Impacts on recreational activities and uses in this area would be related to visual experiences (see Section 4.8 Visual Resources).

Low impacts for 8.8 miles, and no impacts for 16.6 miles of this route segment.

4.5.5 Mitigation Measures

The following mitigation measure has been identified to reduce, avoid, minimize or rectify adverse impacts to recreation resources. This mitigation measure will be implemented where warranted and are anticipated to be effective, and is summarized in Table 4.5-2 below.

TABLE 4.5-2 PROJECT RECREATION IMPACT MITIGATION MEASURES

MITIGATION MEASURE	DESCRIPTION
REC-1: Modify Structure/ROW Location	Within the standard limits of structure design, single pole and H-frame structures will be located so as to span or avoid sensitive features, and to preserve recreational uses. Avoidance measures may include structure micro-siting, placing access roads and structures at the edge of park boundaries, spanning features, placing structures outside of use areas or the realigning of access roads and ROW centerline.

4.5.6 Residual Impacts

To minimize the effects of Project construction and operation conflicts with recreational activity displacement, mitigation measure REC-1: Modify Structure/ROW Location will be implemented in specific locations as necessary. Mitigation measure REC-1 will be effective at mitigating impacts by reducing the potential operational and maintenance interference and conversion of recreational areas to non-recreational uses. This mitigation measure will be implemented in the following locations:

- Route Segment 3b: MP 17.3-19.0
- Route Segment 3c: MP 19.3-19.4, 20.6-21.4

TABLE 4.5-3 RESIDUAL IMPACTS TO RECREATION BY ROUTE SEGMENT

	RESIDUAL IMPACTS (MILES)			
ROUTE SEGMENT	NO IDENTIFIABLE	LOW	MODERATE	HIGH
1a* 2.2 miles	2.2	0	0	0
1b* 12.5 miles	12.5	0	0	0
1c 12.9 miles	1.8	11.1	0	0
2a* 1.0 mile	0	1.0	0	0

ROUTE SEGMENT	RESIDUAL IMPACTS (MILES)			
	NO IDENTIFIABLE	LOW	MODERATE	HIGH
2b 16.4 miles	0	16.4	0	0
2c* 18.1 miles	6.5	11.6	0	0
2d* 7.0 miles	0	7.0	0	0
3a* 0.1 mile	0.1	0	0	0
3b 21.7 miles	19.4	0.6	1.7	0
3c* 25.4 miles	16.6	8.8	0	0

*Route segments that comprise the Agency Preferred Alternative.

4.5.7 Impact Summary By Alternative

4.5.7.1 No Action

Under the No Action Alternative, the proposed Project would not be constructed or operated. No Project-related impacts to recreation would occur.

4.5.7.2 Route Alternatives

Table 4.5-4 presents a summary of residual impacts for each of the end-to-end alternatives following the implementation of mitigation measures.

The mileage of moderate impacts on recreation resources would be highest and identical for Alternatives B, C, E and G. The greatest mileage of low impacts to recreational uses would occur for Alternative F, and the fewest would be for Alternative C. The greatest mileage of no identifiable impacts on recreation resources would be for Alternative F.

TABLE 4.5-4 RECREATION RESOURCES RESIDUAL IMPACT SUMMARY BY ALTERNATIVE

ALTERNATIVE	RESIDUAL IMPACTS (MILES)			
	HIGH	MODERATE	LOW	NO IDENTIFIABLE
Alternative A 1a, 1b, 2a, 2b, 2d, 3a, 3c 64.5 miles	0	0	32.9	31.6
Alternative B 1a, 1b, 2a, 2b, 2d, 3a, 3b 61.0 miles	0	1.7	24.7	34.6
Alternative C 1a, 1b, 2a, 2c, 2d, 3a, 3b 62.8 miles	0	1.7	19.9	41.2
Alternative D **(Agency Preferred Alternative)** 1a, 1b, 2a, 2c, 2d, 3a, 3c 66.3 miles	0	0	28.1	38.2
Alternative E 1a, 1c, 2a, 2b, 2d, 3a, 3b 61.4 miles	0	1.7	35.8	23.9
Alternative F 1a, 1c, 2a, 2b, 2d, 3a, 3c 64.9 miles	0	0	44.0	20.9

ALTERNATIVE	RESIDUAL IMPACTS (MILES)			
	HIGH	MODERATE	LOW	NO IDENTIFIABLE
Alternative G 1a, 1c, 2a, 2c, 2d, 3a, 3b 63.2 miles	0	1.7	31.0	30.5
Alternative H 1a, 1c, 2a, 2c, 2d, 3a, 3c 66.7 miles	0	0	39.2	27.5

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4.6 SPECIAL MANAGEMENT AREAS

Special management area (SMA) impacts could be created as a result of the construction, operation and maintenance of the Project. Impacts would be caused by the displacement or alteration of existing uses or activities occurring within the SMA, or conflict with legislative mandates, recognized values, and/or goals, objectives, standards and policies of the management documents or agencies.

4.6.1 Methods and Impact Types

4.6.1.1 Analysis Methods

The SMA impact methodology used was similar to land use resources and included:

- Identifying the types of Project effects on SMA resources;
- Evaluating the intent of the designation, and any specific legislative or planning directives related to the management of the SMA;
- Developing criteria for assessing impact intensity;
- Assessing impacts considering the effectiveness of project design features;
- Introducing specific mitigation measures in specific locations to reduce impacts if possible; and
- Evaluating residual impacts.

4.6.1.2 Impact Criteria

Impacts on SMAs were determined based on compatibility with the use of the area, legislative mandates, recognized values, and/or goals, objectives, standards and policies of the management documents or agencies.

The potential change describes the physical changes that could potentially occur to a SMA use or activity, or conflict with legislative mandates, recognized values, and/or goals, objectives, standards and policies. Changes could be brought about by:

- Acquisition of land or property rights to accommodate the Project;
- Installing the Project;
- The physical presence and operation of the Project; and
- Managing the right-of-way (ROW) and maintaining the Project.

The potential for change from introducing transmission line facilities differs from one SMA to another with respect to what might be altered and to what extent. This potential for change is predicted by evaluating the environmental conditions, the Project description, and project design features.

4.6.1.3 Impact Types

Physical impacts to recognized values were assessed along the centerline of each of the route segments for the inventoried SMA. The impact types identified along the centerlines of alternative route segments are characteristically direct and long-term, and include any impact that:

- Displaces, alters, or otherwise physically affects any existing, developed or planned SMA; and
- Construction or presence of the Project conflicts with legislative mandates, recognized values, and/or goals, objectives, standards and policies of the management documents or agencies.

4.6.2 Impact Levels (High, Moderate, Low, No Identifiable Impact)

Potential impacts to SMA resources were assessed along the assumed centerline of the proposed 230 kilovolt (kV) transmission line and access roads. The assumed centerline of the proposed 230 kV transmission line for impact assessment is 125 feet wide (i.e., the proposed ROW width). The location of SMAs in the Project area and their proximity to the route segments are shown Appendix A: Jurisdiction, Recreation and Special Management Areas.

High
Impacts would be considered high where the Project would:

- Create long-term effects on the use of SMAs or recognized values described in the applicable agency management documents.

Moderate
Impacts would be considered moderate where the Project would:

- Create short-term effects on the use of SMAs or recognized values described in the applicable agency management documents.

Low
Impacts would be considered low where the Project would:

- Not noticeably change or would cause only a minor change in the primary use, use patterns, function, status and/or recognized/protected values of the SMA and/or would generally be in conformance with goals, objectives, standards and policies of the management documents or managing agency policies applicable to the SMA.

No identifiable impact would occur where SMA management uses would be able to continue as they currently exist and/or be in complete compliance with the goals, objectives, standards and policies of the management documents or managing agency policies applicable to the SMA, even with the presence of the transmission line.

4.6.3 Impacts Common to All Route Segments

There are no impacts common to all route segments pertaining to SMAs.

4.6.4 Impacts Specific to Route Segments

Long-term and short-term impacts to SMA resources were assessed for each route segment and are presented in Table 4.5-2. Impacts for each route segment are discussed in detail in the following sections.

4.6.4.1 Route Segment 1a (Agency Preferred Alternative)

There are no SMAs associated with Route Segment 1a and no impacts would occur.

4.6.4.2 Route Segment 1b (Agency Preferred Alternative)

Low impacts for 12.6 miles on the Yakima Hills Important Bird Area (IBA) will occur as a result of the Project, because there are no specific management requirements in place as part of the IBA status. The goal of the IBA program is to identify the most essential areas for birds, monitor those sites for changes to birds and habitat, and work with land owners and managers to conserve these areas for long-term protection. The Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) is recognized as an

IBA based on the presence of greater sage-grouse habitat. Sage-grouse resources would be affected at a moderate to low level, but the status and management of the IBA will remain intact. Specific biological impacts to greater sage-grouse are detailed in Section 4.3 Wildlife and Special Status Wildlife Species.

4.6.4.3 Route Segment 1c

There are no SMAs associated with Route Segment 1c and no impacts would occur.

4.6.4.4 Route Segment 2a (Agency Preferred Alternative)

There are no SMAs associated with Route Segment 2a and no impacts would occur.

4.6.4.5 Route Segment 2b

There are no SMAs associated with Route Segment 2b and no impacts would occur.

4.6.4.6 Route Segment 2c (Agency Preferred Alternative)

There are no SMAs associated with Route Segment 2c and no impacts would occur.

4.6.4.7 Route Segment 2d (Agency Preferred Alternative)

No direct or indirect impacts would occur to the BLM McCoy Canyon Area of Critical Environmental Concern (ACEC). The McCoy Canyon ACEC is not crossed by the Project, and is located 0.4 mile to the east of Route Segment 2d (refer to Appendix A: Jurisdiction, Recreation and Special Management Areas).

4.6.4.8 Route Segment 3a (Agency Preferred Alternative)

There are no SMAs associated with Route Segment 3a, and no impacts would occur.

4.6.4.9 Route Segment 3b

The Hanford Reach of the Columbia River and public lands within 0.25 mile was recommended for inclusion (eligible) in the National Wild and Scenic Rivers (WSR) system as a “Recreational River” as a result of a study conducted by the National Park Service. The eligible section begins one mile downstream from the outflow of the Priest Rapids Dam (free flowing river section) near the Yakima-Grant-Benton County line and includes approximately 0.25 mile on each side of the river. The USFWS, who has oversight responsibility, manages the proposed “Recreational River" in such a manner as to protect and enhance the values which caused it to be recommended for inclusion in the National WSR system. No public lands are crossed within 0.25 mile of the Eligible Columbia River WSR, and no impacts would occur.

4.6.4.10 Route Segment 3c (Agency Preferred Alternative)

No impacts would occur to the McCoy Canyon ACEC, Hanford Reach National Monument (HRNM), Columbia NWR, or Lower Crab Creek Unit of the Columbia Basin Wildlife Area. Impacts in the Eligible Columbia River WSR would be low for 0.2 mile (on U.S. Bureau of Reclamation [Reclamation] lands) because the Project would not adversely affect any of the seven outstandingly remarkable resources, as defined in Section 3.6 Special Management Areas. The resources would be protected by project design features implemented as part of the Project. Impacts to Chinook salmon, federally recognized rare plant and animal species, and the intact ecosystem of the river and adjacent Wahluke Slope within 0.25 mile of the eligible portion of the river on public lands are expected to be low or none (see Section 4.2 Vegetation and Special Status Plant Species and 4.3 Wildlife and Special Status Wildlife Species). Physical impacts on American Indian cultural resources and archeological artifacts and sites within 0.25 mile of the river on public land adjacent to the eligible WSR are not expected (see Section 4.11 Cultural Resources). Hydrology and geological impacts will be low in this area of the route segment.

4.6.5 Mitigation Measures

Project design features described in Chapter 2 are designed to reduce effects from the proposed Project; therefore, no additional mitigation would be required.

4.6.6 Residual Impacts

Residual impacts are identical to the impacts described in Sections 4.6.4 because no additional mitigation measures are proposed for SMAs.

4.6.7 Impact Summary By Alternative

4.6.7.1 No Action

Under the No Action Alternative, the proposed Project would not be constructed or operated. No Project-related impacts to SMAs would occur.

4.6.7.2 Route Alternatives

No impacts to SMAs would occur for Alternatives E and G. Low impacts would occur for 0.2 mile for Alternatives F and H. Low impacts would also occur for 12.8 miles for Alternatives A and D (Agency Preferred Alternative), and 12.6 miles of Alternatives B and C.

4.7 TRANSPORTATION

Transportation impacts could be created as a result of the construction, operation and maintenance of the Project. The focus of the analysis was on both the potential closure of travel lanes and the direct effects of closures/blockages on other facilities, and physical impacts on infrastructure.

4.7.1 Methods and Impact Types

4.7.1.1 Analysis Methods

Sensitivity ratings were developed for transportation resources that could be impacted by the Project. Sensitivity is defined as a measure of probable response of a resource to direct and indirect impacts associated with the construction, operation and maintenance of a transmission line. Sensitivity ratings were assigned to transportation resources within the Project area. These ratings were based upon a relative evaluation of the resource's importance and the impact potential that the construction and maintenance of the transmission line would have upon transportation resources for the short-term (construction period) and long-term (operations and maintenance) durations of the Project. The determinations of sensitivity levels included consideration of:

- Roadway Classification
- Closures
- Present and Future Uses
- Traffic Levels
- Access

Using the framework defined above, the transportation network crossed by the route segments was analyzed and assigned relative sensitivity rating for potential impacts within the Project study area. Sensitivity ratings were categorized as high, moderate or low. Table 4.7-1 summarizes transportation resource sensitivity in the Project area.

TABLE 4.7-1 TRANSPORTATION RESOURCE SENSITIVITY CLASSIFICATION

TRANSPORTATION RESOURCE	SENSITIVITY
Interstate and state highways	High
Private air strips	High
County and local roads	Moderate
U.S. Bureau of Land Management (BLM) primary access roads (gravel)	Low
BLM two-track secondary roads (dirt)	Low
Private roads	Low

4.7.1.2 Impact Criteria

Impacts on transportation resources were determined based on duration of impact, type of impact (function and operation or physical), existing traffic levels and traffic level increases based on the Project requirements, potential access impacts, and future use considerations.

4.7.1.3 Impact Types

A transmission line is inherently more likely to affect transportation facilities (roadways) during construction than during operation, because there is typically only a minimal amount of surface activity to operate a transmission line after construction is completed.

Direct and indirect impacts could include increases in traffic, detours along some roads and disrupted access to driveways. Construction of the transmission line is not expected to cause major traffic delays or road closures. Minor traffic delays or interference with the highway system would most likely result from construction activities. Transmission line construction should not require temporary closure of the main highways (State Route [SR] 24, SR 243). Users of smaller roads may experience minor delays.

Impacts associated with the proposed Project would be short-term and related to the movement of personnel and equipment during construction of the transmission line. Traffic associated with operations would involve a limited number of vehicle trips during routine inspection and maintenance activities. Transmission line inspection and maintenance traffic would occur infrequently, and would not involve large numbers of vehicles or workers.

The transportation impact types would consist of the following:

- Short-term impacts types would be created when:
    - Construction would cause temporary lane closures that disrupt traffic flow;
    - Construction would temporarily disrupt the operation of emergency service providers;
    - Construction vehicles would cause physical damage to roads; and/or
    - Construction would generate additional traffic on regional and local roadways.

- Long-term operation impacts would be created when:
    - Operation of the transmission line could interfere with aviation safety.

4.7.2 Impact Levels

Transportation impact levels were defined as follows:

High
- Create long-term effects on the use of roads that requires modification of traffic patterns;
- Affect aviation safety and/or air traffic operations;
- Create long-term alterations of access to agricultural areas;
- Restrict emergency access to developed areas;
- Cause damage to state highways or county roads; and/or
- If normal use of state highways and county roads in the Project area were halted or impaired for considerable periods each day during project construction.

Moderate
- Cause some minor damage to state highways and county roads; and/or
- If normal use of state highways and county roads were halted or impaired for relatively short periods during project construction.

Low
- No damage to state highways or county roads; and/or
- If normal use of state highways and county roads were halted or impaired for only brief periods during project construction.

4.7.3 Impacts Common to All Route Segments

Short-term construction impacts would include increased traffic levels or roadways used to transport equipment, materials and personnel to construction areas and potential damage to existing state, county and local roadways, traffic delays as a result of construction vehicles entering and exiting roads in the area, improvements to existing access roads, and construction of new temporary access roads.

Construction equipment, materials, and personnel would be transported to the Project area using existing and new access roads, and county, state and private roads. Construction activity and movement of heavy equipment would be short-term. Equipment and materials delivery to worksites would generally occur during normal, daytime construction hours. The anticipated transmission line construction workforce and equipment are detailed in Section 2.4.3.14.

The Project would not likely require any road closures during construction, regardless of the alternative. Construction vehicles would temporarily increase traffic and could lead to short-term traffic delays on existing roads used to access the Project area. The primary transportation corridors in the Project area (Interstate 82 [I-82], SR 24, SR 243) would be used for the duration of the construction phase of the Project (six to nine months).

The interstate and state highway system will be used to transport construction materials and workers into the Project area from labor and material source locations. The use of county roads for construction would be limited to only those roads that are necessary for access to the Project ROW and substations. Traffic delays are likely to occur intermittently in localized areas and only where necessary during construction. Traffic would be rerouted if possible to minimize traffic flow disruption. Construction related impacts will be moderate to low.

Construction may have to cross a roadway or run parallel to a roadway with or adjacent to a public right-of-way (ROW). Transmission line stringing activities over state highways and county roads could require the temporary closure of traffic lanes potentially resulting in traffic congestion. Temporary road crossing structures would be placed on either side of the roadway to ensure the safe installation and tensioning of conductors crossing the roadway.

Damage to the existing road infrastructure could occur as a result of heavy equipment or vehicles utilizing the road system, and could cause local traffic delays. All vehicles utilizing public roads will be within the legal size and weight limit, and oversized vehicles will have obtained the necessary permits and be properly flagged and accompanied by escort vehicles as necessary. The operation of equipment and vehicles will potentially track dust, soil, gravel and other material onto roadway surfaces, but the implementation erosion control plans that include stabilized construction access areas will limit impacts on roads and low impacts will result.

Improvements to local roads (including those located on U.S. Bureau of Reclamation [Reclamation], BLM, and state lands) may occur in selected areas as necessary for construction access. Improvements may include widening, adding gravel, grading, culvert and drainage ditch installation, brush clearing or other measures as described in Section 2.4.3.2. If structures are installed in agricultural fields, Pacific Power will construct temporary access roads if necessary, stripping, stockpiling and restoring soil as part of the construction process. Impacts on the existing transportation system from access road construction and improvements will be short-term and low.

Long-term impacts will occur as a result of permanent, new access road construction. In areas where the current road system does not provide access to the Project ROW, new roads will be constructed. These roads would occur where overland travel is not possible due to terrain, vegetation, slope or other conditions that require surface clearing and grading for access. The level of ongoing maintenance of these roads would be determined based on local conditions and Pacific Power maintenance crews. Road building related impacts specific to environmental resources such as vegetation, wildlife and land use are covered in those resource specific sections of this document.

Operation and maintenance impacts would result from periodic access and use of state and county roads during the life of the Project. Except in isolated locations, vegetation maintenance requirements will be minimal because the Project is located in an area typically dominated by low growing sagebrush and grassland vegetation. If access to a structure located in an agricultural area is necessary for emergency repairs or maintenance, Pacific Power would pay the landowner or lease holder for any crop damage that occurs. Impacts to the existing road system are expected to be low during project operation and maintenance because vehicles would only access the Project ROW periodically and would not affect local traffic conditions.

Even with the implementation of project design features in place to limit unauthorized access to private or public lands by the installation of gates and other traffic control measures, there is still the potential for unauthorized access and use of newly established roads. The potential impacts that result from unauthorized use of access roads include soil erosion, fire danger, the introduction of noxious weeds, vegetation and wildlife disturbance, habitat disturbance, and cultural effects. These effects are covered in the applicable resource discussions of Section 4.0.

A helicopter would be used during construction and may be used during periodic maintenance inspections for all route segments. Any helicopter flights would be coordinated with other local flight plans as required.

The proposed Project will not affect jet routes, air space, or create an obstruction to controlled or uncontrolled airspace. There currently are multiple very-high and high voltage transmission lines throughout the project area. The proposed 230 kilovolt (kV) Columbia River crossing structures will be in the same areas as existing structures (for either crossing alternative) and will be less than 200-feet in height. These structures and the 100-foot tall wood pole H-frame and single pole structures will not affect commercial or military aviation operations. A review by the Federal Aviation Administration (FAA) and Washington State Department of Transportation (WSDOT)-Aviation as part of the permitting process will further minimize any potential conflicts created by the project.

4.7.4 Impacts Specific to Route Segments

4.7.4.1 Route Segment 1a (Agency Preferred Alternative)

The primary access to this segment would occur from I-82 and East Selah Road from the west. The highest impacts on transportation for Route Segment 1a will be as a result of traffic delays during construction along Sage Trail Road. This road is typically 15 to 20 feet wide along the length of the Project, and road closure and the rerouting of traffic may be necessary. The opportunity to re-route traffic is limited along this route due to the configuration and scarcity of roads in the area. Construction activities along this segment will be fairly brief in relation to the overall Project, and impacts would be moderate. Improvements to the road will not likely be necessary, as the gravel road is in generally good condition and will be able to accommodate the necessary equipment and vehicles. Moderate impacts on transportation would result from the construction of Route Segment 1a.

Route Segment 1a would require the construction of less than 4,860 feet of spur roads off of existing roads. No new access road construction (Level 4+ as described in Table 2-4) would be necessary for this route segment.

4.7.4.2 Route Segment 1b (Agency Preferred Alternative)

Route Segment 1b would be located in the Joint Base Lewis-McChord Yakima Training Center (JBLM YTC), and accessed from Sage Trail Road. The fire break perimeter road would serve as the primary access road to the transmission line. Some new road construction, however, would be required where the route segment diverges from the perimeter of the JBLM YTC. Resulting impacts on the existing roads would be low.

Route Segment 1b would require the construction of approximately 4.5 miles of spur roads and approximately 1.3 miles of access roads for a total of 5.8 miles of new roads. Low impacts are expected as a result of the construction of Route Segment 1b.

4.7.4.3 Route Segment 1c

This route segment would also be accessed from Sage Trail Road as well as Arthur Boulevard and John Street, William Court, and various 2-track roads northwest of Kittitas Canyon. Sumerset Drive and Chapman Road would provide access adjacent though Kittitas Canyon north of Mieras Road, and minimal improvements would be necessary for these roads. New road construction accounts for the majority of road building for this route segment. The route segment would be accessed by Coombs Road and would follow Mieras Road on the south end of the route segment. Mieras Road is a gravel road from the Coombs Road intersection east, and Coombs Road is a gravel road from Mieras Road south. These roads would not require improvements. East of a residential area generally east of the Mieras Road-Prairie Road intersection, new road construction would be necessary along the southern border of JBLM YTC.

Route Segment 1c would require the construction of approximately 3.9 miles of spur roads and approximately 4.4 miles of access roads for a total of 8.3 miles of new roads. If the Project used JBLM YTC roads, Route Segment 1c would require the construction of approximately 5.1 miles of spur road and no new access road, a difference of 3.2 miles. Moderate to low impacts will result from the construction of Route Segment 1c.

4.7.4.4 Route Segment 2a (Agency Preferred Alternative)

Access to Route Segment 2a would be from the east end of Postma Road, and new road construction would be required. Improvements to a 2-track road would be required. Resulting impacts on the existing roads would be low. Route Segment 2a would require the construction of approximately 1,050 feet of new spur road and 0.6 mile of new access road for a total of 0.8 mile of new road.

4.7.4.5 Route Segment 2b

Route Segment 2b generally crosses rangeland with limited 2-track road development. These 2-track roads would require improvement to varying degrees, and new road construction would account for most of the roads along this segment. Route Segment 2b would require the construction of approximately 1.9 miles of new spur roads and approximately 15.2 miles of access roads for a total of 17.1 miles of new roads. Existing roads located within the JBLM YTC may be utilized where the Project follows the southern boundary of the base. If the Project used JBLM YTC roads for access, Route Segment 2b would require the construction of approximately 4.6 miles of spur road and 6.1 miles of new access road for a total of 10.7 miles of new roads, a difference of 6.4 miles of new road construction. Resulting impacts would be low.

4.7.4.6 Route Segment 2c (Agency Preferred Alternative)

Much of this route segment would be accessed along the existing Union Gap-Midway 230 kV/Midway-Moxee 115 kV corridor access roads. However, this segment also crosses undeveloped land with limited, 2-track road access that would require some improvements. Route Segment 2c would require the construction of approximately 5.0 miles of spur roads and approximately 6.2 miles of access roads for a total of 11.3 miles of new roads.

The construction and operation of the Project could affect local air traffic, which may consist of aerial applicators servicing the agricultural fields located adjacent to the existing Midway-Moxee 115 kV corridor. However, because there are already existing transmission lines in the area and notification of applicators would occur, low impacts are expected.

4.7.4.7 Route Segment 2d (Agency Preferred Alternative)

Route Segment 2d generally crosses rangeland with limited 2-track road development. These 2-track roads would require improvements to varying degrees, and new road construction would account for more than half of the new roads constructed along this segment. Route Segment 2d would require the construction of approximately 1.5 miles of new spur roads and approximately 4.7 miles of access roads for a total of 6.2 miles of new roads. Resulting impacts would be low.

4.7.4.8 Route Segment 3a (Agency Preferred Alternative)

Route Segment 3a is located adjacent to existing transmission lines interconnecting with the Vantage Substation, and these would be utilized for route access. Minimal spur road construction would be necessary for this route segment, and impacts would be low. Route Segment 3a would require the construction of approximately 420 feet of new spur roads off of existing roads. No new access road construction (Level 4+ as described in Table 2-4) would be necessary for this route segment. Resulting impacts would be low.

4.7.4.9 Route Segment 3b

This route segment follows the abandoned railway corridor, and access along the route segment would be provided utilizing the abandoned Chicago, Milwaukee, St. Paul & Pacific (C, M, SP, & P) Railroad bed. Access to the route segment from the south would be via the Midway Substation Road located directly off of SR 24, or from Huntzinger Road from the north. The Midway Substation Road is paved to the vicinity of the substation, and Huntzinger Road is paved for 10.8 miles from I-90 to the Auvil Fruit Company entry area. Improvements would not typically be necessary along these access routes, but may be necessary where the Project follows the railroad corridor because widening or other improvements to the railroad bed may be necessary. The highest impacts on transportation for Route Segment 3b would be as a result of traffic delays during construction along Huntzinger Road, and road closure for a short period of time may be necessary. Because this is the only road servicing the area, rerouting traffic would not be possible. Resulting impacts would be moderate.

On the east side of the Columbia River, existing roads would require minimal improvements, and the Project would cross SR 243, requiring consultation with WSDOT. Authorization to span the Columbia River for Route Segment 3b would be required from the U.S. Army Corp of Engineers (USACE) through the Section 10 Rivers and Harbors Act permitting process. Resulting impacts on the transportation network in this area would be low. Flashing lights or spherical balls on the conductors may be required for the portion of the route segment crossing the Columbia River. Pacific Power would consult with the FAA regarding the installation of lights or any other visual warning devises required for aviation safety. Resulting impacts would be low.

Route Segment 3b would require the construction of approximately 8.5 miles of spur roads off the existing railroad. No new road construction would be necessary for this route segment (Level 4+ as described in Table 2-4). Spur road construction would be minimal where the Project is adjacent to the railroad ROW, and would be located primarily where the project deviates somewhat from the centerline/offset of ROW. These areas include locations where multiple angle structures would be constructed in highly curving areas of the ROW (requiring additional spur road), north of the agricultural area along the west side of the Columbia River, and near the north Columbia River crossing.

The construction and operation of the Project could affect local air traffic, which may consist of aerial applicators potentially servicing the Auvil Fruit Company agricultural fields. However, because notification of applicators would occur, low impacts are expected.

4.7.4.10 Route Segment 3c (Agency Preferred Alternative)

This route segment follows the railroad corridor on the south side of the Columbia River, and crosses the river south of SR 243, crossing the road to the northeast. Temporary road closure of the highway is possible for a brief period during construction, causing moderate impacts. It also follows Road N SW, which is posted for agricultural operational use only. A portion of the line would follow the existing Hanford-Vantage 500 kV corridor, and access would be from the existing road servicing that transmission line. This route segment would also cross the Lower Crab Creek Road and the Milwaukee Corridor, spanning the trail and allow current recreational use and potential future transportation uses to occur unaffected. Short-term impacts to agricultural operations would occur due Project construction along Road N SW because this road is used for field and irrigation infrastructure access. Resulting impacts would be low.

The construction and operation of the Project could affect local air traffic, which may consist of aerial applicators potentially servicing the agricultural fields located adjacent to the existing corridors. However, because there are already existing transmission lines in the area and notification of applicators would occur, low impacts are expected. This route segment also would potentially affect the operations of the private air strip located northeast of Beverly, but impacts would be low because the Project would not break the approach angles and existing transmission lines are currently located in the area (Hanford-Vantage 500 kV transmission line). Resulting impacts would be low.

This route segment crosses public lands in BLM's Saddle Mountains Management Area (MA) that are either open to off-highway vehicle (OHV) use or where OHV use is restricted to designated roads and trails. Impacts from increased OHV use on the limited use area would be low if control measures, such as barriers or gates, are put in place on newly constructed transmission line roads in the open areas. Therefore impacts here would be low to moderate.

Authorization to span the Columbia River for Route Segment 3b would be required from the USACE through the Section 10 Rivers and Harbors Act permitting process. Flashing lights or spherical balls on the conductors may be required for the portion of the route segment crossing the Columbia River. Pacific Power would consult with the FAA regarding the installation of lights or any other visual warning devises required for aviation safety. Resulting impacts would be low.

Route Segment 3c would require the construction of approximately 8.6 miles of spur roads and approximately 3.3 miles of new access roads for a total of 11.9 miles of new roads.

TABLE 4.7-2 NEW ROAD CONSTRUCTION SUMMARY BY ROUTE SUMMARY

ROUTE SEGMENT	MILES OF NEW SPUR ROAD	MILES OF NEW ACCESS ROAD	TOTAL MILES OF NEW ROAD
1a* 2.2 miles	0.92	0	0.92
1b* 12.5 miles	4.52	1.32	5.84
1c 12.9 miles	3.88/5.12[1]	4.43/0[1]	8.31/5.12[1]
2a* 1.0 mile	0.2	0.64	0.84

ROUTE SEGMENT	MILES OF NEW SPUR ROAD	MILES OF NEW ACCESS ROAD	TOTAL MILES OF NEW ROAD
2b 16.4 miles	1.88/4.60[1]	15.23/6.11[1]	17.11/10.71[1]
2c* 18.1 miles	5.04	6.23	11.27
2d* 7.0 miles	1.48	4.67	6.15
3a* 0.1 mile	0.08	0	0.08
3b 21.7 miles	8.52	0	8.52
3c* 25.4 miles	8.64	3.28	11.92

[1] Miles of new road not utilizing JBLM YTC roads/Miles of new road utilizing JBLM YTC roads (Access Model A/Access Model B)
*Route segments that comprise the Agency Preferred Alternative.

4.7.5 Mitigation Measures

Project design features described in Chapter 2 are designed to reduce effects from the proposed Project; therefore, no additional mitigation would be required.

4.7.6 Residual Impacts

Residual impacts are identical to the impacts described in Sections 4.7.4 because no additional mitigation measures are proposed for transportation.

4.7.7 Impact Summary By Alternative

4.7.7.1 No Action

Under the No Action Alternative, the proposed Project would not be constructed or operated. No Project-related impacts to transportation would occur.

4.7.7.2 Route Alternatives

Alternative C would require the least distance of new road, totaling 33.6 miles, and Alternative F would require the most, totaling 45.3 miles. Use of JBLM YTC road for access on state, private and BLM lands adjacent to the base would result in approximately 6.4 miles less road construction for Alternatives A and B, 9.6 miles less of new road construction for Alternatives E and F, and 3.2 miles less new road construction for Alternatives G and H. Impacts for all alternatives would be moderate to low.

TABLE 4.7-3 NEW ROAD CONSTRUCTION SUMMARY BY ALTERNATIVE

ALTERNATIVE	MILES OF NEW SPUR ROAD	MILES OF NEW ACCESS ROAD	TOTAL MILES OF NEW ROAD
Alternative A 1a, 1b, 2a, 2b, 2d, 3a, 3c 64.5 miles	17.72/20.44[1]	25.13/16.02[1]	42.85/36.45[1]
Alternative B 1a, 1b, 2a, 2b, 2d, 3a, 3b 61.0 miles	17.6/20.32[1]	21.85/12.74[1]	39.45/33.05[1]
Alternative C 1a, 1b, 2a, 2c, 2d, 3a, 3b 62.8 miles	20.76	12.86	33.61

ALTERNATIVE	MILES OF NEW SPUR ROAD	MILES OF NEW ACCESS ROAD	TOTAL MILES OF NEW ROAD
Alternative D (Agency Preferred Alternative) 1a, 1b, 2a, 2c, 2d, 3a, 3c 66.3 miles	20.88	16.14	37.01
Alternative E 1a, 1c, 2a, 2b, 2d, 3a, 3b 61.4 miles	16.96/20.92[1]	24.96/11.42[1]	41.91/32.33[1]
Alternative F 1a, 1c, 2a, 2b, 2d, 3a, 3c 64.9 miles	17.08/21.04[1]	28.24/14.70[1]	45.31/35.73[1]
Alternative G 1a, 1c, 2a, 2c, 2d, 3a, 3b 63.2 miles	20.12/21.36[1]	15.96/11.54[1]	36.08/32.89[1]
Alternative H 1a, 1c, 2a, 2c, 2d, 3a, 3c 66.7 miles	20.24/21.48[1]	19.24/14.82[1]	39.48/36.29[1]

[1] Miles of new road not utilizing JBLM YTC roads/Miles of new road utilizing JBLM YTC roads (Access Model A/Access Model B).

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4.8 VISUAL RESOURCES

Visual resource impacts would be created as result of the construction, operation and maintenance of the Project, and would be caused by Project components (e.g., structures, lines, roads, equipment) being seen from sensitive viewpoints; the effects of Project components on the inherent aesthetic values of the landscape or compatibility developed landscape, and from the effects on the Visual Resource Management (VRM) Classes as identified by the U.S. Bureau of Land Management (BLM). The effects on VRM Classes is determined by an assessment of whether or not the Project is in compliance with the stated objectives as defined in the BLM Manual 8400 series and current policy. Compliance with other state, regional or local applicable policies, goals, and objectives as identified in the land management documents (e.g., county General Plans) was also considered as part of the compliance analysis.

4.8.1 Methods and Impact Types

4.8.1.1 Analysis Methods

The impact assessment closely follows the procedures identified in the BLM's VRM system as detailed in the Contrast Rating Manual 8431-1, with modifications appropriate to the proposed Project and lands not under the jurisdiction of the BLM. The modified process considered Project visual compatibility with the developed landscape, along with the VRM components of scenic quality, viewer sensitivity, distance zones, and contrast. A contrast analysis was conducted along all Project segment centerlines using Form 8400-4 and geographic information system (GIS) modeling that utilized the access road disturbance model (see Section 2.4.3.2), vegetation and slope data, and existing transmission configuration data.

The effects analysis utilized a combination of GIS modeling, primary observation, and visual simulation development to evaluate the effects of the Project on visual resources. Viewshed modeling in combination with contrast analysis was used to assess viewer impacts, an assessment from identified Key Observation Points (KOPs) was conducted, mitigation measures were developed for agency consideration, and residual impacts were determined. Simulations were produced to assist in the assessment, and were used to illustrate the major visual impacts from KOPs.

Visibility from sensitive viewpoints was generated by GIS using digital terrain data from the U.S. Geological Survey (USGS) and the sensitive viewpoints mapped. Because structures have not been sited and engineered for each alternative route, landscape visibility was mapped using a 90 foot uniform structure height for the centerline of each route segment. The 90-foot height is representative of the height expected for the majority of structures. Typical H-frame structure height is expected to be approximately 65 to 90 feet, while a single pole structure may be 80 to 110 feet tall.

Digital imaging, GIS, computer aided design, and global positioning system (GPS) software assisted in the development of the photo-simulations. The software used in photo-simulation includes:

- *Adobe Photoshop CS5*– Used for photo manipulation and merging.
- *Bentley MicroStation* v8i – Used for modeling transmission structures photo matching, lighting, materials, and rendering simulations.
- *Bentley Inroads v8.5* – Used for Digital Terrain Mapping (DTM) and modeling.
- *ArcView* – Used for geographic information Project data mapping.

The process of photo-simulation began with taking field photographs, documenting viewpoint locations (coordinates) and weather conditions, and matching those photographs with Project terrain models developed using Microstation. Computer models of the transmission lines and substation were introduced into the terrain model based on preliminary facility layouts developed in ArcView and AutoCAD. The final image is a composite of the 3-dimentional structure modeling and the original photograph. The process ensured that spatial relationships, perspective, proportions and similar visual attributes were accurate and matched existing landscape conditions.

The photographs were taken by a Canon DSLR Rebel XSI 12 megapixel digital camera (KOPs 1 and 7) with an 18mm-55mm zoom lens or a Ricoh 500SE GPS-ready digital camera (KOP 5). The camera was hand held at eye-level (approximately 5 feet, 6 inches). The date, time of day, GPS coordinate (latitude/longitude) and weather conditions were documented.

The proposed structure types were modeled based on engineering structure standards provided by Pacific Power. Final engineering of the transmission line would occur after the environmental analysis phase of the Project, and actual pole locations and configurations may deviate from the simulations shown in Appendix C-4.

4.8.2 Impact Criteria

Impacts are created as a result of Project contrast, or change, in viewing conditions or scenic quality, and impacts are measured by the alteration of existing form, line, color and/or texture in the vegetation, landform and structures (built features, architectural character). Impacts are a product of how changes are viewed (distance, viewing angle) or the change in the inherent qualities of the (man-made or natural) landscape. Impact to viewers depends on the visual sensitivity of the viewer (see Section 3.8.2.4). Visual contrast is the basis on which visual impacts are measured.

4.8.2.1 Contrasts

Contrasts range from weak to strong, with resulting impacts based on visibility and distance. For scenic quality, contrast directly affects the inherent scenic quality of the landscape, or, conversely, is related to the ability of existing development character to absorb the engineered architectural form/line/color/texture of the Project. The impact analysis for the Project was based on contrast and visibility modeling and the Contrast Rating Worksheets (Form 8400-4) from representative sensitive viewpoints (KOPs). A contrast model was used as a basis to assess impacts along the alternative route segments. The contrast model consisted of landscape contrast and structure contrast, which were combined to determine overall Project contrast along the route segments. A database of Project contrast was mapped and entered into the GIS for the impact analysis. Contrast was compared with Project visibility, scenic quality or visually dominant development character.

The visual assessment considered landform, vegetation and structure contrast. Landform and vegetation contrast was determined based on the access road disturbance model (as described in Section 2.4.3.2) and existing vegetation, and was expressed as an overall landscape contrast (see Table 4.8-1 below). Vegetation or land cover was grouped into visually similar categories (Group 2, Group 3, etc.) based on the anticipated visual contrasts produced as a result of vegetation removal during Project construction and through operation. Open water, agricultural areas, and exposed rock areas assumed no vegetation removal, and vegetation contrast would not occur, and road building would not occur in agricultural areas, on basalt cliffs, in developed areas, or where open water is present (N or No Contrast).

TABLE 4.8-1 LANDSCAPE (LANDFORM AND VEGETATION) CONTRAST MATRIX

VEGETATION GROUP	ACCESS LEVEL			
	0	1 OR 2	3 OR 4	5, 6 OR 7
1 - Agriculture, Basalt Cliff/Rock, Disturbed/Developed, Water	N	N	N	N
2 – Annual or Perennial Grassland, Forbs	N	W	W	M
3 – Rabbitbrush or Sagebrush Perennial/Annual, Riparian	N	W	M	S
4 – Aspen, Trees	N/A	S	S	S

Key: N=No Contrast; S=Strong; M=Moderate; W=Weak

For example, in areas where the Project crosses sagebrush (Vegetation Group 3), and where new road construction on slopes of eight to 15 percent (Access Level 5) are anticipated for the Project (also see Appendix A – Access Map), a strong landscape contrast is predicted. Similarly, crossing an area of annual or perennial grassland combined (Vegetation Group 2) with a Project Access Level 1 or 2 would result in weak landscape contrasts because road widening or improvements would occur in already graded areas and low growing vegetation removal would not greatly contrast with graded areas. However, in areas of overstory tree cover (Vegetation Group 4), removal of this vegetation would create strong contrasts due to road or right-of-way (ROW) clearing regardless of the scope of access road construction.

Structure contrast was based on existing utility line infrastructure adjacent to the Project. The Project route segments parallel three major utility corridors and would potentially consolidate two sections of distribution line. New structures would also be introduced where currently no existing utility lines exist. A total of seven combinations of potential structure configurations are possible, resulting in varying degrees of structure contrast (no existing transmission, distribution underbuild, Project parallels 230 kilovolt (kV) and 115 kV corridor, Project parallels lattice 500 kV, and Project parallels 2-230 kV and 2-500 kV corridor). Table 4-8.2 - Structure Contrast Matrix shows the various combinations, landscape viewing context, and resulting structure contrast.

As the final step in contrast analysis, the overall Project contrast was determined based on the combination of landscape and structure contrast along the route segment centerlines (see Table 4.8-3). Strong structure contrasts but weak landscape contrasts would typically produce strong-moderate Project contrasts, for example. In situations where no new roads are being built and minimal ground cover vegetation is removed (weak landscape contrast), the introduction of a new 90-foot H-frame structure where none currently exists would create strong overall visual contrasts because the transmission line structures are the primary Project elements that affect viewers or landscapes.

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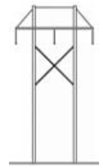
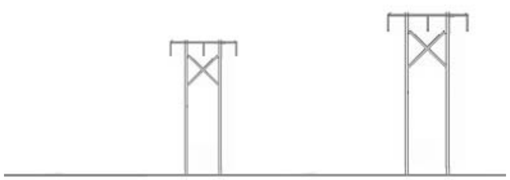
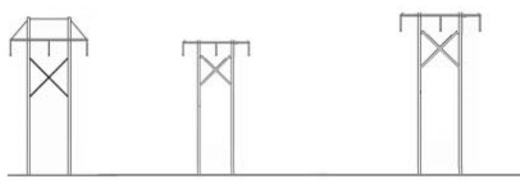
TABLE 4.8-2 STRUCTURE CONTRAST MATRIX

Existing Corridor	Proposed Corridor (Configuration #)	Viewing Context	Structure Contrast
No Structures	 New H-Frame Wood Pole: 230 kV (#1)	Varies; typical structure	***Strong***
No Structures	 New Single Wood Pole: 230 kV: Route 1a, Portion of Route 2c, Route 3b, Portion of Route 3c (#2)	Yakima Ridge, Black Rock Valley; Columbia River; Residential and Agricultural Land Use	***Strong***
 Existing Distribution	 New Single Wood Pole 230 kV with Distribution Under-build (#3)	Yakima Ridge, Moxee Valley; Residential Land Use	***Strong/Moderate***
 Existing 115 kV & 230 kV H-Frame Wood Pole (Midway-Moxie 115 kV & Union Gap-Midway 230 kV)	 New H-Frame Wood Pole 230 kV/ Existing 115 kV & 230 kV H-Frame Wood Pole (#4)	Black Rock Valley; Grazing and Undeveloped Land Use	***Weak***

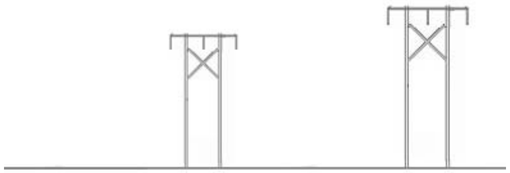
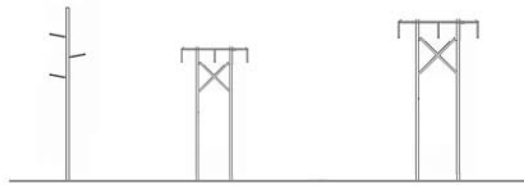
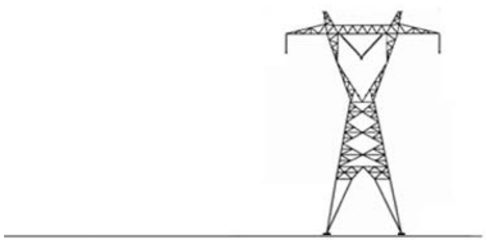
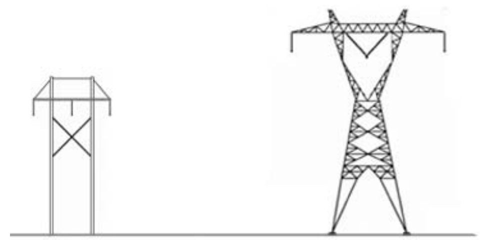
Existing Corridor	Proposed Corridor (Configuration #)	Viewing Context	Structure Contrast
 Existing 115 kV & 230 kV H-Frame Wood Pole (Midway-Moxie 115 kV & Union Gap-Midway 230 kV)	 New Single Wood Pole 230 kV/ Existing 115 kV & 230 kV H-Frame Wood Pole (#5)	Black Rock Valley; Grazing and Agricultural Land Use	***Moderate/Weak***
 Existing Steel 500 kV (Hanford-Vantage #1)	 New H-Frame Wood Pole / Existing Steel 500 kV (#6)	Saddle Mountains, Crab Creek Valley; Recreational/Multi-Use Land Use; Residential/Agricultural Land Use	***Moderate***
(MULTIPLE LINES NOT ILLUSTRATED) Existing Pomona-Wanapum 230 kV, Wanapum-Wind Ridge 230 kV, Schultz-Vantage 500 kV, Schultz-Wanapum 500 kV Corridor	**(MULTIPLE LINES NOT ILLUSTRATED)** New Steel Lattice 203 kV and H-Frame Wood Pole/ Existing Pomona-Wanapum 230 kV, Wanapum-Wind Ridge 230 kV, Schultz-Vantage 500 kV, Schultz-Wanapum 500 kV Corridor (#7)	Columbia River Corridor, Wanapum Dam/Vantage Substation Industrial Area	***Weak***

TABLE 4.8-3 PROJECT CONTRAST MATRIX

	STRUCTURE CONTRAST				
LANDSCAPE CONTRAST	**STRONG**	**STRONG-MODERATE**	**MODERATE**	**MODERATE-WEAK**	**WEAK**
Strong	S	S	S/M	M	M
Moderate	S	S/M	M	M	M/W
Weak	S/M	M	M	M/W	W
N/A, None	M	M	M/W	W	W

Key: S=Strong; S/M=Strong/Moderate; M=Moderate; M/W= Moderate/Weak; W=Weak.

4.8.2.2 Impact Types

Direct and indirect visual resource impacts are difficult to distinguish because the effects occur at the same time and place but simultaneously occur at a further removed distance (e.g., impacts as a result of views from sensitive recreation area and scenic quality impacts on vegetation and landform). Impacts may be considered short-term and long-term.

The development of the Project has the potential to result in three basic types of impacts to visual resources. Construction impacts are considered temporary, and result from the presence of construction vehicles and equipment that cause ground disturbance, equipment structure contrasts, and air emissions. Operations and maintenance impacts may be short-term or long-term. Maintenance activities are also considered short-term (and periodic), and are also related to the presence of construction vehicles and equipment and associated ground and air disturbances. Operations impacts are primarily associated with the long-term use and presence of the Project (transmission lines, structures, substations, access roads) in the landscape. Visual contrast (see Section 4.8.2.1 above), including the effects of light and glare, are produced during construction, operations, and maintenance of the Project.

The general types of impacts caused by the construction, operations, and maintenance of the Project include:

- Introduction of visually dominant transmission structures (wood H-frame, wood single pole, steel lattice structures) that contrasts with the developed or natural landscape;
- Potential glare created by the presence of the conductors (wires) and associated marker balls (if used for avian mitigation or air traffic safety);
- Landform and vegetation contrasts (grading and vegetation removal) caused by the construction of access roads or road improvements, pulling and tensioning sites, work areas, and laydown areas;
- Structure contrast caused by construction equipment, helicopter conductor stringing, and yarding/staging areas; and
- Additional construction of substation equipment within the fence lines of the Pomona Heights and Vantage substations.

As previously stated, impacts associated with the Project affect scenic quality and sensitive viewers. These impacts also relate to whether or not the Project is in compliance with agency management objectives (VRM, General Plans, etc.).

Scenic Quality Impacts and Development Character Compatibility

Scenic quality, as discussed in Section 3.8.4.3, was inventoried during the Visual Resource Inventory (VRI) as part of the BLM planning process or Project inventory. The Project would impact the inherent scenic quality of the landscape independent of how it is viewed from any particular viewpoint. Impacts would be highest on those landscapes that exhibit high visual variability and diversity in terms of land form/vegetation/water and form/line/color/texture and where the Project strongly or moderately contrasts with those elements (see Table 4.8-4). Similarly, the dominant development character, as identified in Section 3.8.4.3, may be affected by the Project if that character is not compatible with the industrial, linear, and vertical visual character of the Project. Though the immediate surrounding land use may be agricultural or residential, for example, the visual influence of a utility corridor greatly affects the impression or character of the landscape in the vicinity of those industrial features (e.g., immediate foreground). The existing transmission corridors and related infrastructure (e.g. substations, dams) also would absorb and be visually compatible with the Project even if the form, line, color, or texture of the Project somewhat contrasts with existing engineered features that dominate that developed area. Therefore, the character of the industrial area would remain even though cumulative impacts would occur. Conversely, in an area where the dominant developed character is expressed by organic, non-linear, and/or architectural (rather than engineered) forms, lines, colors and textures, the Project would not be compatible with that character.

Sensitive Viewer Impacts

Where contrast or compatibility directly affects scenic quality or dominant developed character regardless of potential viewers, how contrast is seen in the landscape causes impacts on sensitive viewers (see Tables 4.8-5 and 4.8-6). Strong contrasts may occur along a segment of the Project, but if those contrasts are not seen by a sensitive viewer, there would be no viewer impacts (although scenic quality impacts would occur to some degree). Views from representative KOPs (as identified in Section 3.8.4.4) documents how contrast is seen in the Project area from specific viewpoints. Viewing variables such as direction of view, landform, vegetation or architectural screening influence how sensitive viewers are impacted by the Project and how contrasts are seen in the landscape. Impacts are highest on sensitive viewers where static (stationary), direct, unimpeded views of the Project would occur at close viewing distance and where the Project would dominate and contrast with the existing elements of form, line color and texture of the viewed landscape. Conversely, low sensitivity viewers seeing the Project for a short duration in an area of weak contrasts (e.g., highly developed industrial areas) may not notice any change in the landscape (low impact).

Agency Management Compliance

Conformance with the stated goals and objectives identified in agency planning documents detailed in Section 3.8.3 was assessed for each of the route segments. On BLM lands, compliance with Interim VRM Class III was determined based views from KOPs and as identified during the contrast analysis (see Section 4.8.2.1). Using BLM Form 8400-1 (Contrast Rating Form), all elements of landform, vegetation and structure contrast in form, line, color and texture must be in conformance with the Interim VRM Class III from identified KOPs. As stated in BLM Manual Handbook H-8410-1 – Visual Resource Inventory, BLM's standard for VRM Class III conformance is as follows:

> *"The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant features of the natural landscape."*

4.8.3 Impact Levels

Impact levels were recorded in one-tenth (0.1) mile increments along each route segment and alternative based on contrast and visibility/scenic quality. Potential impacts were also recorded in data tables for each impact level change along each route segment and alternative. Each potential impact was

documented considering the implementation of project design features, and additional specific mitigation measures were recommended where effective to reduce visual impacts. The impacts remaining after applying specific mitigation measures are referred to as residual impacts.
Impacts were also determined based on viewing condition variables, and are specific to each viewing location or corridor. These variables were based on observation in the field. The viewing variables considered include:

1) The visual influence of an industrial or developed setting on the landscapes and views that reduces impacts;
2) Focal points in the landscape or orientation of dominant views are directed away from the Project;
3) Viewer and Project position in the landscape (viewing Project from below);
4) Views that are brief and/or intermittent; and
5) Views that are typically screened by vegetation, landform or architectural features.

Visual impact levels generally get lower as visual contrasts become weaker or as the distance from the contrast as seen from viewpoint increases. Similarly, landscapes with little visual variety or interest are less affected by the introduction of a new transmission line. Visual impacts were determined by comparing Project contrast with scenic quality or visibility from high or moderate sensitivity viewpoints as identified in Section 3.8.4.3 and 3.8.4.4 and as shown in Tables 3.8-5 though 3.8-7. Impacts are based on primary observation (e.g., views from KOPs, field reconnaissance), consideration of viewing variables, and implementation of selective mitigation measures, and are described in Sections 4.8.4 and 4.8.7 for the route segments and alternatives. Proposed mitigation measures are discussed in detail in Section 4.8.6. Visual impacts were determined for all route segments, and are defined as follows:

High – High visual impact would result from strong, strong-moderate or moderate contrasts in Class A scenic quality landscapes and strong contrasts in Class B landscapes (refer to Table 4.8-4). High impacts would also occur as a result of strong Project contrasts being viewed in the immediate foreground or foreground of high and moderate sensitivity viewers, and strong contrasts seen in the middleground of high sensitivity viewers (refer to Tables 4.8-5 and 4.8-6). High impacts would also occur as a result of strong-moderate Project contrasts being seen in the immediate foreground or foreground of high sensitivity viewers, and in the immediate foreground of moderate sensitivity viewers. High impacts would also result from moderate contrasts being seen in the middleground by high sensitivity viewers.

Moderate – Moderate potential visual impacts would result from moderate-weak or weak contrasts in Class A scenic quality landscapes, from strong-moderate or moderate contrasts in Class B landscapes, and from strong or strong-moderate contrasts in Class C landscapes (refer to Table 4.8-4). Moderate impacts would also occur as a result of strong contrasts being seen in the background of high sensitivity viewers, or in the middleground or background of moderate sensitivity viewers (refer to Tables 4.8-5 and 4.8-6).

Low – Low potential visual impacts would result from moderate weak or weak contrasts in Class B scenic quality landscapes or moderate, moderate-weak or weak contrasts in Class C landscapes (refer to Table 4.8-4). Low impacts would result from weak contrasts being viewed in the foreground of high sensitivity viewers, or in the immediate foreground of moderate sensitivity viewers (refer to Tables 4.8-5 and 4.8-6).

TABLE 4.8-4 SCENIC QUALITY IMPACTS

SCENIC QUALITY	PROJECT CONTRAST				
	STRONG	STRONG/MODERATE	MODERATE	MODERATE/WEAK	WEAK
A	H	H	H	M	M
B	H	M	M	L	L
C	M	M	L	L	L

H = High Impacts; H/M = High/Moderate Impacts; M = Moderate Impacts; M/L = Moderate/Low Impacts; L = Low Impacts.

TABLE 4.8-5 HIGHLY SENSITIVE VIEW IMPACTS

DISTANCE ZONE	PROJECT CONTRAST				
	STRONG	STRONG/ MODERATE	MODERATE	MODERATE/WEAK	WEAK
0 to 1,000 feet (IFG)- *Pole/H-frame* 0 to 0.75 mi.(IFG)-*Crossing LST*	H	H	H	M	M
1,000 feet to 0.33 mi. (FG)- *Pole/H-frame* 0.75 mi. to 1.5 mi. (FG)-*Crossing LST*	H	H	M	M	L
0.33 mi. to 1 mi. (MG)- *Pole/H-frame* 1.5 mi. to 3 mi. (MG)-*Crossing LST*	H	M	M	L	L
1 to 2 mi. (BG)- *Pole/H-frame* 3 mi. to 4 mi. (BG)-*Crossing LST*	M	M	L	L	L
Beyond 2 mi. (SS) - *Pole/H-frame* Beyond 4 mi. (SS)-*Crossing LST*	L	L	L	L	L

H = High Impacts; H/M = High/Moderate Impacts; M = Moderate Impacts; M/L = Moderate/Low Impacts; L = Low Impacts
IFG = Immediate Foreground; FG = Foreground; MG = Middleground; BG = Background, SS=Seldom Seen
LST= Lattice Steel Tower; mi. = miles.

TABLE 4.8-6 MODERATELY SENSITIVE VIEW IMPACTS

DISTANCE ZONE	PROJECT CONTRAST				
	STRONG	STRONG/ MODERATE	MODERATE	MODERATE/WEAK	WEAK
0 to 1,000 feet (IFG)-*Pole/H-frame* 0 to 0.75-mi.(IFG)-*Crossing LST*	H	H	M	M	L
1,000 feet to 0.33 mi. (FG)-*Pole/H-frame* 0.75 mi. to 1.5 mi. (FG)-*Crossing LST*	H	M	M	L	L
0.33 mi. to 1 mi. (MG)-*Pole/H-frame* 1.5 mi. to 3 mi. (MG)-*Crossing LST*	M	M	L	L	L
1 to 2 mi. (BG)- *Pole/H-frame* 3 mi. to 4 mi. (BG)-*Crossing LST*	M	L	L	L	L
Beyond 2 mi. (SS)-*Pole/H-frame* Beyond 4 mi. (SS)-*Crossing LST*	L	L	L	L	L

H = High Impacts; H/M = High/Moderate Impacts; M = Moderate Impacts; M/L = Moderate/Low Impacts; L = Low Impacts
IFG = Immediate Foreground; FG = Foreground; MG = Middleground; BG = Background, SS=Seldom Seen
LST= Lattice Steel Tower; mi. = miles.

4.8.4 Impacts Common to All Route Segments

Short-term visual impacts related to the presence and operation of construction vehicles, equipment, traffic, fugitive dust affecting views would be common for all route segments. Contrasts related to the staging and laydown areas would be short-term and common to all route segments, as would the effects of additional equipment associated with the expansion of the Pomona Heights Substation. Staging areas would be located in previously disturbed areas, so the primary visual impacts associated with those sites would be related to the short-term presence of construction materials creating structure contrasts, and also would be independent of route segments. Pulling and tensioning sites would also cause short-term landscape (vegetation) contrasts and structure contrasts. The presence of a helicopter during the stringing of the transmission line would cause short-term structure contrasts, potentially disrupting views or scenic vistas (e.g., toward the Cascade Mountains). The temporary structure work areas, turn-around areas, and staging areas would cause low impacts due to the duration of landscape (vegetation) and structure contrasts.

Maintenance activities, such as periodic patrolling of the line, would be conducted with helicopters semi-annually and with all terrain vehicles (ATVs) or 4x4 trucks. The locations of these inspections are dependent on the route segment, but would be common to all routes. Short-term structure contrasts created by the presence of patrol vehicles, equipment used for necessary hardware maintenance and repairs (boom and bucket trucks, flatbed trucks, etc.), ROW maintenance (and vegetation management), and associated fugitive dust potentially impacting views would create low impacts common to all routes. Operational impacts (e.g., the presence of the transmission line structures, conductors, access roads) would cause the greatest long-term impacts, and would be dependent on the location of the route segments, as described below. Long-term Project visual impacts are summarized in Table 4.8-7.

4.8.5 Impacts Specific to Route Segments

4.8.5.1 Route Segment 1a (Agency Preferred Alternative)

Visual Contrasts

Along this route segment, the presence of the new wood pole structures would create strong/moderate to moderate visual contrasts. The existing distribution line would be rebuilt between milepost (MP) 0.2 and 1.6 (see Appendix A-Visual Resources map), creating strong/moderate structure contrasts (see configuration #3, Table 4.8-2 Structure Contrast Matrix), and no existing transmission or distribution structures exist between MP 0.0 and 0.2, and MP 1.6 to 2.2 (see configuration # 2, Table 4.8-2 Structure Contrast Matrix). Landscape contrast would be none to weak, because the existing road would typically be used and vegetation cover is not often present due to development or is low growing, herbaceous ground cover. Between MP 0.1 and 0.6 and on the east end of this route segment (MP 1.8-2.2), dense, shrubby vegetation (Group 3) removal as a result of spur road construction would cause greater landscape and Project contrast. Overall, Project contrast would be moderate to strong-moderate along this route segment.

TABLE 4.8-7 VISUAL IMPACT SUMMARY BY ROUTE SEGMENT

VISUAL IMPACT	ROUTE SEGMENT (MILES OF IMPACT)									
	1a*	1b*	1c	2a*	2b	2c*	2d*	3a*	3b	3c*
Impacts on Viewers										
Residential (High Sensitivity)										
High	2.3	2.8	6.2	0.1	0.1	0.7	0	0	3.4	5.9
Moderate	0	7.5	5.0	0.9	4.6	8.7	1.9	0	8.5	12.1
Low	0	2.3	1.8	0	11.7	8.8	5.2	0.2	9.9	7.3
Recreational and Travelers (High Sensitivity)										
High	0	0	0	0	0	0	0	0	3.2	2.6
Moderate	0.4	0	0	0	0	0	0	0	2.6	2.0
Low	1.9	12.6	13.0	1.0	16.4	18.2	7.1	0.2	16.0	20.7
Recreational and Travelers (Moderate Sensitivity)										
High	0.5	0.5	0.2	0	0	0	0	0	6.7	4.0
Moderate	1.8	4.9	7.7	0.2	2.6	4.0	2.2	0	11.9	7.8
Low	0	7.2	5.1	0.8	13.8	14.2	4.9	0.2	3.2	13.5
Impacts on Scenic Quality										
High	0	0	0	0	0	0	3.1	0	4.3	5.3
Moderate	0	10.0	10.2	1.0	14.6	8.7	3.7	0	14.4	2.9
Low	0	2.1	1.2	0	1.8	0.3	0.3	0	0.3	3.1
Interim VRM Class III Compliance										
Compliant	-	-	-	-	0.7	-	1.0	-	0.5	4.5
Non-Compliant	-	-	-	-	0.0	-	0.0	-	0.0	0.0

*Route segments that comprise the Agency Preferred Alternative.

Scenic Quality Impacts and Development Character

The landscape of Route Segment 1a is developed in character, with low density residential visual elements dominating the scenery and the natural landscape being visually subordinate with the scenery, influencing middleground and background views (e.g., Yakima Ridge, Cascade Range). This residential character is affected along the route by the presence of the Pomona-Wanapum 230 kV transmission line crossing the area, which contributes industrial visual elements in an otherwise predominantly residential setting. However, because of the industrial nature of the Project and visual separation from the existing line from the proposed transmission line, the Project's form, line, color and texture would not be compatible with the predominant residential architectural features (low, clustered, geometric, blocky), and would create high impacts on the developed landscape.

Sensitive Viewer Impacts

Residences located along Sage Trail Road and adjacent roads would have new structures in the line of sight of Mt. Rainier, and the Project structures may impede views in this location. The new pole structures would create high impacts on residential viewers located on Sage Trail Road. These impacts are the result of generally strong to strong/moderate structure contrasts seen in the immediate foreground. Structures could potentially obstruct views of Mt. Rainier (MP 1.7) and affect views across the Selah Valley to the northwest (MP 0.7-2.1). Also, new conductors would be reflective for several years after installation, producing diffused reflection (glare) that would contrast with the daytime sky or landscape backdrop. KOP 1, located on the east of Sage Trail Road (see Appendix A: Project Maps-Visual Resources), illustrates views along Sage Trail Road where 3-pole angle-guyed structures and single wood poles are proposed. A visual simulation of the Project from this KOP is shown in Appendix C-4: KOP 1.

Views of the Project from residences located in the County Squires Mobile Manor are generally screened by vegetation, but some would view the Project against the Yakima Ridge. From this location, the Pomona-Wanapum 230 kV transmission line is also within the foreground viewshed, and low impacts on theses residences are anticipated. Residences in this area, as well as on the west end of Sage Trail Road and travelers along East Selah Road, would see weak contrasts in the immediate foreground as a result of additional equipment installed in the Pomona Heights Substation as part of the Project upgrades, and visual impacts would be low.

Viewers using East Selah Road would have very brief views of the Project in the immediate foreground. Views from both travelling directions are generally screened by buildings, vegetation, and topography. The Project would be seen in the visual context of the existing Pomona-Wanapum 230 kV transmission line, Pomona Heights Substation, and existing transmission lines located along East Selah Road. Impacts would be low on these viewers, also.

Agency Management Compliance

There are no federal or state lands crossed by this route segment. The Project would comply with the visual standards identified in the Yakima County Comprehensive Plan.

4.8.5.2 Route Segment 1b (Agency Preferred Alternative)

Visual Contrasts

Structure contrast would be strong along this entire route segment; no existing transmission line infrastructure or other substantial development, other than adjacent residential development, is located within this corridor. Route Segment 1b would generally follow the southern boundary of the Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) on federal land, and would utilize the existing fire break road following the property line. Because access for the Project would be "Level 2" (use existing roads), typically, along most of the route, and because the existing vegetation is Group 2 or 3 (shrubs and/or grassland), landscape contrast would be weak. Short segments of this route segment would deviate from the fire break road, and new access may be required (see MP 9.6-10.9) in an area of Group 3 or 4 vegetation (sagebrush/rabbitbrush/overstory trees), causing strong landscape contrasts. The strongest visual contrasts would occur in these areas where new road and structure installation would occur in steeper areas of Group 2 or 3 vegetation. Typically, Project contrasts would be strong-moderate, with some isolated areas of strong or moderate where vegetation, slope and road construction variables reduce or increase overall visual contrast.

Scenic Quality Impacts and Development Character

Scenic quality impacts would be moderate to low in the Class C Yakima Ridge landscape setting along this route segment. The Project would be compatible with the existing development character where it crosses in the vicinity of the Ellensburg-Moxee #1 115 kV transmission line corridor (MP 0.2-0.3). However, the vertical H-frame structures and linear features of the conductors (wires) would contrast with the simple rolling, undulating, and horizontally flowing lines of the landforms of Yakima Ridge. Moderate scenic quality impacts would occur along a portion of Route Segment 1b, but would otherwise be low. No high scenic quality impacts are expected as a result of the Project for Route Segment 1b.

Sensitive Viewer Impacts

Residences would be affected by the construction and operation of the transmission line, because the H-frame structures and conductor wires would be seen in the immediate foreground and foreground of residences located on Sage Trail Road, Summerset Drive, and Bohoskey Drive (MP 0.0-0.2, 5.8-6.2). Strong contrast would be seen in the middleground from residences located north of Mieras Road and along St. Hilaire Road (see KOP 2, Appendix C-3) where the Project would be skylined (MP 6.5-6.7), causing moderate residual impacts at this distance. Strong to strong-moderate Project contrasts would also be seen by residences viewing the line in the foreground from Mieras Road against Yakima Ridge in the background (MP 5.8-6.2). One residence located on Summerset Dr. in Kittitas Canyon adjacent to JBLM YTC would view strong to strong-moderate contrasts in the immediate foreground (MP 5.8-6.2) and Project skylining in the middleground (MP 6.5-6.7) resulting in high to moderate impacts. Residences located on the east end of Postma Road would view strong Project contrasts generally in the background and middleground.

Agency Management Compliance

Federal land crossed is administered by the JBLM YTC, which does not have any identified goals, policies, and standards regarding the management of visual resources.

4.8.5.3 Route Segment 1c

Visual Contrasts

Structure contrast would be strong along this entire route segment; no existing transmission line infrastructure or other substantial development, other than adjacent residential development, is located within this corridor. Route Segment 1c would generally follow the southern boundary of the JBLM YTC on private land, and would require new access in some areas where no roads are currently constructed. Significant road construction would be required for a portion of this route, modifying the vegetation and landform and creating moderate to strong landscape contrasts along several segments of this route. Much of the route would require clearing of sagebrush or other shrub vegetation for road construction. Project contrasts would typically be strong to strong-moderate along this route, with some isolated areas of moderate Project contrast in areas of Group 1 or 2 vegetation and Level 2 or lower road construction (MP 9.9-11.4). Project contrasts would be slightly reduced (e.g., from strong to strong/moderate, strong/moderate to moderate) if the JBLM YTC access road was used for Project construction and maintenance. This would reduce landscape contrasts because new roads would not be bladed and the existing firebreak road would require minimal improvements compared to private 2-track roads. Landscape contrasts created as a result of work pad construction and structure installation and presence, however, would remain. Overall, the affects of reduced Project contrasts would only affect impacts on middleground, high sensitivity views and foreground moderate sensitivity views, reducing impacts from high to moderate. Impacts would be reduced from high to moderate along 2.5 miles due to reduced contrasts (see sensitive viewer impact discussion below).

Scenic Quality Impacts and Development Character

Scenic quality impacts would typically be moderate in strong and strong-moderate contrast areas of Class C landscape along this route segment, and low in isolated areas of moderate Project contrast. Scenic quality impacts would not be substantially reduced by using the JBLM YTC firebreak road (Access Model B). For a short distance the, dominant development character is influenced by the Ellensburg-Moxee #1 115 kV transmission line corridor, and the Project would be compatible in this setting (MP 0.2-0.3).

Sensitive Viewer Impact

Impacts on sensitive viewers would be similar to Route Segment 1b, but this segment would be closer to residences located on Sage Trail Road, Summerset Drive, and Bohoskey Drive, where strong to strong/moderate contrasts would be seen in the immediate foreground, foreground and middleground. Strong contrast would be seen in the middleground from residences located north of Mieras Road and along St. Hilaire Road (see KOP 2, Appendix C-3) where the Project would be skylined (MP 6.4-6.6), causing moderate impacts at this distance. One residence located on Summerset Dr. in Kittitas Canyon adjacent to JBLM YTC would view strong to strong-moderate contrasts in the immediate foreground (MP 5.7-6.2) and Project skylining in the middleground (MP 6.4-6.6) resulting in high to moderate impacts. Residences located at the north end of Coombs Road and along Mieras Road would view the Project in the immediate foreground and foreground where Project contrasts would be strong/moderate to moderate, creating high impacts. Some of these residences have views of the Moxee Valley and Mount Adams, which would be affected by the presence of the line (see Appendix C-3: KOP 3). The Project may obstruct the line of sight to Mount Adams (MP 10.2-10.7).

High visual impacts on residences would be reduced to moderate impacts in the middleground for approximately 2.5 miles if the existing firebreak road was utilized for Project access and construction, because new road grading and clearing would not be necessary, resulting in reduced landscape contrasts.

Agency Management Compliance

There is no federal land crossed by this route segment. The Project would comply with the visual standards identified in the Yakima County Comprehensive Plan. The route segment crosses one mile of state owned land. The state of Washington does not have goals, policies or standards regarding the management of visual resources.

4.8.5.4 Route Segment 2a (Agency Preferred Alternative)

Visual Contrasts

Structure contrast would be strong along this entire route segment; no existing transmission line infrastructure or other substantial development is located within this corridor. Some new road construction would be necessary along this route segment resulting in the removal of grassland or other herbaceous ground cover, therefore, landscape contrasts would be moderate to weak, depending on the slope. Overall, Project contrasts would be strong/moderate and in limited areas, strong.

Scenic Quality Impacts and Development Character

Scenic quality impacts would be moderate for this route segment, with the vertical H-frame structures and linear features of the conductors would contrast with the simple rolling, undulating, and horizontally flowing lines of the landforms of the Yakima Ridge.

Sensitive Viewer Impacts

The nearest sensitive viewers are residences located at the east end of Postma Road, who would have middleground views of typically strong-moderate Project contrasts. Residual impacts on viewers would be low. Impacts on residences would typically be moderate, and high in a limited area (MP 0.7-0.8) where strong contrasts occur.

Agency Management Compliance

There are no federal or state lands crossed by this segment. The Project would comply with the visual standards identified in the Yakima County Comprehensive Plan.

4.8.5.5 Route Segment 2b

Visual Contrasts

Structure contrast would also be strong along this entire route, because no existing or related transmission lines currently exist in this corridor. Landscape contrast varies due to the presence of intermittent two-track roads and variable vegetation. New road construction would create visual contrasts in slopes of up to 30 percent, and work pad construction would require grading and vegetation removal. Most of this route segment would create strong to strong-moderate visual contrasts. The use of JBLM YTC fire access roads would somewhat reduce visual contrasts by reducing the extent of necessary road construction where the Project is located adjacent to the base but on private or BLM owned land. However, because this route segment is located in the background or seldom seen distance zone for high and moderate sensitivity viewers, because the route is located in a Class C landscape, and because Project contrasts would remain strong/moderate to moderate, visual impacts would not substantially differ should the Project utilize JBLM YTC access roads.

Scenic Quality Impacts and Development Character

Scenic quality impacts would be moderate to low in the undeveloped Class C landscape that is similar to the other routes located in the undeveloped Yakima Ridge area.

Sensitive Viewer Impacts

Sensitive viewers, which include residences and State Route (SR) 24 travelers (see Appendix C-3: KOP 4) would view moderate to strong Project contrasts in the background or seldom seen distance zone except on the far western end of the route, where high impacts on residences located at the east end of Postma Road and Deeringhoff Road would occur for a short distance. The implementation of mitigation measure VIS- 2 between MP 0.0 and MP 0.4 would reduce the contrast created by the conductor wires and reduce high impacts to moderate, and moderate impacts to low. Moderate impacts created as a result of strong or moderate/strong impacts seen in the background from residential viewers and SR-24 motorists would also occur from MP 11.5 to the east end of the route. Implementation of mitigation measure VIS-2 (non-specular conductors) would reduce these impacts to a low level.

Agency Management Compliance

BLM Interim VRM Class III lands are crossed at MP 4.0-4.2 and MP 12.4-12.9. Project contrasts would be strong because of structures contrasts and access road construction in 0 to 15 percent slope areas with Group 3 vegetation cover. The Project would be compliant with the Interim Class III from residences north of SR 24, the nearest viewpoint, because strong to strong-moderate contrasts are seen in the background or seldom-seen distance zone. The Project is in the seldom seen and background distance zone from the nearest KOP (KOP 4) causing low impacts.

The Project would also comply with the visual standards identified in the Yakima County Comprehensive Plan.

4.8.5.6 Route Segment 2c (Agency Preferred Alternative)

Visual Contrasts

Structure contrasts for Route Segment 2c would vary depending on whether or not the Project is paralleling the Union Gap-Midway 230 kV/Midway-Moxee 115 kV corridor or not, and which structure type (single pole or H-frame) is proposed. Where the Project parallels the existing corridor, structure contrasts would be either moderate/weak or weak (see Table 4.8-2 Structure Contrast: Configuration 4 or 5). This route crosses grassland/herbaceous vegetation, and the clearing and grading associated with access road construction, work pad installation and other construction activities would cause moderate to weak landscape contrasts.

Scenic Quality Impacts and Development Character

Scenic quality impacts would be moderate to low in the undeveloped Class C landscape that is similar to the other routes located in the undeveloped Yakima Ridge area. As the Project enters the Moxee Valley

Agricultural Development Character Area (as described in Section 3.8.2.3), it would also follow the existing Union Gap-Midway 230 kV/Midway-Moxee 115 kV transmission line corridor. The Project would be compatible with the existing character as it parallels these existing transmission lines.

Sensitive Viewer Impacts

Moderate impacts would occur on residences located north of SR 24 in the Moxee Valley viewing moderate Project contrasts in the immediate foreground for a short distance (0.4 mile). Background views of strong contrasts would also occur, also cause moderate impacts. High impacts on residences would occur where strong contrasts are seen in the middleground. Impacts would otherwise typically be low on residences.

Motorists using SR 24 would view the Project in the foreground where weak Project contrasts would occur causing low impacts. Some of this route segment also would cause moderate impacts on motorists where they would view strong and strong-moderate contrasts in the background.

Agency Management Compliance

There are no federal or state lands crossed by this segment. The Project would comply with the visual standards identified in the Yakima County Comprehensive Plan.

4.8.5.7 Route Segment 2d (Agency Preferred Alternative)

Visual Contrasts

Structure contrast would be strong along this entire route segment. Landscape contrast is generally strong to moderate due to the extent of access road construction and necessary sagebrush/rabbitbrush vegetation removal. Some areas would be accessible via overland travel, and therefore no landscape contrasts would occur. Structure contrasts would remain, however. Typically, Project contrasts would be strong or strong-moderate. Helicopter placement of transmission line structures between MP 6.6 and 7.0 would reduce landscape contrasts by eliminating need for road construction and associated clearing and grading activities.

Scenic Quality Impacts and Development Character

Scenic quality impacts would be moderate to high. High impacts would occur in areas of Class B scenery and strong Project impacts, consisting of most of the route segment from MP 2.9 to 7.0. Moderate to low scenic quality impacts would occur from MP 0.0 to 2.9 in a Class C landscape.

Sensitive Viewer Impacts

Visibility of the Project from the moderate sensitivity SR 24 corridor and high sensitivity residential viewpoints would be in the background or seldom seen distance zones, where strong contrasts would cause moderate and low impacts.

As seen from the Columbia River recreation corridor and SR 243, the Project would be skylined as it descends from the Umtanum Ridge (MP 6.14-6.2). The Project would result in moderate impacts in this area.

Agency Management Compliance

BLM Interim VRM Class III lands are crossed between MP 1.0 and MP 2.0. Project contrasts would be strong to strong-moderate because of structures contrasts and access road improvements (Access Level 2) in areas with Group 3 vegetation cover. The Project would be compliant with the Interim Class III from residences north of SR 24, the nearest viewpoint, because strong to strong-moderate contrasts are seen in the background or seldom-seen distance zone. The Project is in the seldom seen and background distance zone from the nearest KOP (KOP 4) causing low impacts.

The Project would comply with the visual standards identified in the Yakima County Comprehensive Plan and Benton County Comprehensive Land Use Plan.

4.8.5.8 Route Segment 3a (Agency Preferred Alternative)

Visual Contrasts

Structure contrast would be weak near the existing Vantage Substation, where multiple transmission lines converge. There would be minimal or no access road improvements necessary due to the existing road network servicing the facility and transmission lines, and therefore, weak landscape contrasts. Overall, weak Project contrasts would occur as a result of this route segment.

Scenic Quality Impacts and Development Character

This route segment is in a highly visually modified corridor, and the Industrial Development Character (see Section 3.8.2.3) and visual influence of the Wanapum Dam and associated substation and transmission infrastructure is compatible with the Project.

Sensitive Viewer Impacts

Residences located to the south would view weak Project contrasts in the background, and low impacts would result. Middleground views would occur from SR 243 and Beverly-Berke Road, and would also be seen through the existing transmission infrastructure, creating low impacts.

Agency Management Compliance

There are no BLM or state lands crossed by this segment, and the Bureau of Reclamation (Reclamation) does not have standards regarding the management of visual resources.

4.8.5.9 Route Segment 3b

Visual Contrasts

Structure contrast would be strong along most of this route segment except where the Project meets the Shultz-Wautoma 500 kV corridor/Columbia River crossing. From the west side of the Columbia River crossing to the Vantage Substation/Route Segment 3a intersection, structure contrasts would be weak. Landscape contrasts would typically be weak because most of the route segment follows the abandoned railroad corridor ROW that would require minimal improvements and vegetation is frequently low growing and herbaceous. Where the Project would require the removal of shrubby vegetation or trees in selected areas (MP 12.9-17.0), weak or strong landscape contrast would occur. Overall, Project contrasts would typically be moderate from MP 0.0 to 12.3, and be strong or strong moderate from MP 12.3 to 19.3, where the Project joins the existing Pomona-Wanapum 230 kV/Wanapum-Wind Ridge 230 kV/Schultz-Vantage 500 kV/Schultz-Wanapum 500 kV corridor and crosses the Columbia River.

Scenic Quality Impacts and Development Character

Scenic quality impacts along this route segment would typically be moderate in a Class B landscape, except in those areas where more visually prominent vegetation would be removed as a result of access improvements. The Project would impact scenic quality by contrasting with the dominating river and lake shorelines, rocky talus slope toes and basalt cliffs. The Project would not traverse Agricultural Development Character Areas, but would be directly adjacent to them. For a short distance, the Project would cross Residential Development Character Areas, also (MP 14.7-15.1). In those areas, the Project would not be compatible the existing landscape character.

Sensitive Viewer Impacts

Residences would view moderate to strong Project contrasts in the immediate foreground in two areas along this segment causing high impacts: the Priest Rapids residential area located on the southwest side of the dam, and an agricultural residential area located on the south end of Huntzinger Road.

Moderate and high sensitivity recreationists using the Columbia River corridor below Priest Rapids Dam, Priest Rapids Lake recreationists and John Wayne Pioneer Trail users would also view moderate to strong Project contrasts in the immediate foreground causing moderate to high visual impacts. The Project would be viewed longitudinally as it follows the John Wayne Trail, and would dominate the viewshed. The Project would affect views from the John Wayne Trail Trailhead (see Appendix C-3: KOP 12), dominating scenic views of the Columbia River corridor to the south.

Motorists and recreationists using Huntzinger Road would also view the Project in the immediate foreground along the road for about five miles (c. MP 13.6-18.7), causing high or moderate impacts.

Agency Management Compliance

BLM Interim VRM Class III lands are crossed between MP 19.1 and MP 19.6. Project contrasts would be strong for a short distance (MP 19.1-19.3). The Project would be in compliance with Interim VRM Class III from KOP 12 (John Wayne Pioneer Trail) because moderate-weak contrasts are seen in the immediate foreground to background distance zone and because the Project would be seen in the middleground distance zone set against the existing Pomona-Wanapum 230 kV/Wanapum-Wind Ridge 230 kV/Schultz-Vantage 500 kV/Schultz Wautoma 500 kV transmission line corridor.

The Project would also comply with the visual standards identified in the Yakima County Comprehensive Plan and all applicable development regulations, the Kittitas County Comprehensive Plan, and the Benton County Comprehensive Land Use Plan.

4.8.5.10 Route Segment 3c (Agency Preferred Alternative)

Visual Contrasts

Structure contrast would typically be strong along this route segment. Where the Project crosses the Vantage-Midway 230 kV/Shultz-Wautoma 500 kV corridor and parallels the Hanford-Vantage #1 500 kV corridor, structure contrasts would be moderate (see Table 4.8-2, Structure Configuration #6). Much of this route segment follows existing roads and portions of agricultural areas, so landscape contrasts would be weak or none. Moderate and strong landscape contrasts occur in the Saddle Mountains Management Area (Saddle Mountains MA) and other areas where no roads occur, typically where the Project does not follow existing transmission lines. Helicopter placement of transmission line structures between MP 20.0 and 20.6 would reduce landscape contrasts by eliminating the need for road construction and associated clearing and grading activities. Structure contrasts would be strongest where at the Columbia River crossing, where 195 feet tall steel lattice structures would be constructed on the north and south sides of the river. The visual influence of the crossing structures would extend further than the typical single pole or H-frame Project wood structures, with immediate foreground views occurring within 0.75 mile of the structures (see distance zone discussion, Section 3.8.2.5).

Scenic Quality Impacts and Development Character

Scenic quality impacts along this route segment would be moderate to high in Class B landscapes along the Columbia River and high in Class A landscapes of the Saddle Mountains and Crab Creek area. The Project would impact the scenic quality of the landscape by contrasting with the dominating river and lake shorelines, rocky talus slope toes and basalt cliffs of the Columbia River, and the rocky outcrops, erosional plumes, and rock formations of the Saddle Mountains. The Project would traverse Agricultural Development Character Areas of the Wahluke Slope, and would not be compatible in this landscape. The Project would cross mixed Agricultural/Residential Development Character Areas, and also would not be compatible with this existing character.

Sensitive Viewer Impacts

Residences would view strong-moderate and moderate Project contrasts in the immediate foreground along the Wahluke slope agricultural area, typically causing high impacts (MP 5.6-6.0, 10.0-10.6, 12.6-13.5). Some views of the Project would be seen in the context of the existing Vantage-Midway/Shultz-Wautoma transmission line corridor in the middleground, and impacts would be low. Immediate foreground views would also occur northeast of Beverly (MP 22.4-22.9, 23.3-24.0), causing high impacts.

Immediate foreground and foreground views of strong contrasts would also occur from recreationists using the Columbia River corridor, causing high impacts. Motorists using SR 243 would also view the Project for a short duration as it parallels and crosses the highway at MP 3.9. Impacts of the line on these viewers would be moderate to low to the north of the highway because the Project would be viewed in the context of the Priest Rapids-Midway transmission corridor. High impacts would occur south of the highway because the Project, including the steel lattice river crossing structures, would be viewed against the Columbia River and Umtanum Ridge basalt cliffs (see Appendix C-4, KOP 5).

The Project crosses the Milwaukee Road Corridor (see Appendix C-3: KOP 9) at MP 21.3-21.4, causing high impacts. The Project would also be in the middleground of recreationists using the Burkett Lake Recreation Area (see Appendix C-3: KOP 8), causing high impacts. The Project would also be in the middleground view of the Saddle Mountains Hang Gliding Launch Area, where the Project would be seen in the valley over 1,800-feet below, causing moderate impacts.

The Project would also parallel and cross 24 SW Road west of Mattawa, causing high impacts for 0.9 mile (MP 11.1-12.0), and cross Lower Crab Creek Road at MP 21.1-21.2 causing high impacts. Moderate impacts would occur where the Project crosses Beverly-Burke Road as it parallels the Hanford-Vantage #1 corridor.

Moderate impacts would occur for a short distance where the Project would be viewed from the Saddle Mountains Recreation Destination Route (R Road Extension), but typically would be low. Views from this road are typically from the inferior position, and the Project would be seen in the context of the existing Hanford-Vantage #1 500 kV corridor. On the north end of this road, views are more sensitive as it enters the high elevations of the Saddle Mountains Management Area. Impacts would be high for a short distance where the Project is skylined and also crosses the road. Contrasts as seen from KOP 7, however, would generally be moderate because of the context of the existing transmission line and distribution infrastructure as seen from this vantage point (see Appendix C-4, KOP 7).

Agency Management Compliance

BLM Interim VRM Class III lands are crossed between MP 14.3 and MP 16.2, and MP 17.0-19.6. Project contrasts would be strong and strong moderate for 1.4 miles of the 4.5 mile Interim VRM Class III crossing (MP 14.3-14.5, 16.0-16.1, 17.7-17.9, 18.7-19.6). As seen from KOP 7, the Project would be in compliance with the Interim VRM Class III designation because strong to strong-moderate contrasts are seen in the immediate foreground to background distance zone would be mitigated (see below), and because the Project would be seen in the context of the existing Hanford-Vantage #1 500 kV transmission line and distribution transmission facilities servicing the communication infrastructure located on the Saddle Mountains.

The Project would also comply with the visual standards identified in the Grant County Comprehensive Plan, Grant County PUD 2010 Final Shoreline Management Plan and Benton County Comprehensive Land Use Plan.

4.8.6 Mitigation Measures

The following mitigation measures have been identified to reduce, avoid, minimize or rectify adverse impacts to visual resources. These mitigation measures would be implemented where warranted and are anticipated to be effective, and are summarized in Table 4.8-8 below.

TABLE 4.8-8 VANTAGE-POMONA HEIGHTS TRANSMISSION PROJECT MITIGATION MEASURES

MITIGATION MEASURE	DESCRIPTION
VIS – 1: Avoid Interference with Prominent Views (Micro-siting)	To minimize visual impacts to sensitive views and within standard engineering practices and to the extent feasible, the final locations of transmission structures would be adjusted to avoid locations that place the structures in the middle of the line of sight toward important views from residences, roads, trails and other key observation areas.
VIS – 3: Maximize Span Length at Linear Feature Crossings	At highways, trails, canyons or other sensitive feature crossings, structures shall be placed at the maximum feasible distance from the crossing within standard structure design, and in conformance with engineering and Pacific Power requirements to reduce visual impacts and potential impacts on recreation values and functions, and to increase safety at these locations.
VIS – 5: Span Matching of Existing Structures	To the extent practicable and within the limits of standard structure design, Pacific Power shall match existing structure spacing, spans and heights as closely as possible to reduce visual complexity as seen from high concern viewpoints.
VIS – 6 : Avoid Skylining of Structures	To the extent practical, Pacific Power shall design and locate transmission structures so that they do not break the skyline or are directly on the skyline when viewed from sensitive viewpoints.

4.8.7 Residual Impacts

To minimize potential impacts to visual resources, selective mitigation measures described above would be implemented. Residual impacts for all of the route segments are presented in Table 4.8-9.

To minimize the effects of potential view obstruction, mitigation measure *VIS-1: Avoid Interference with Prominent Views (Micro-siting)* would be implemented in specific locations as necessary. Mitigation measure VIS-1 would be effective at reducing impacts by siting structures in areas that are not within the line of sight to landscape focal points from specific locations as identified in consultation with the landowner. This mitigation measure would be implemented in the following locations:

- Route Segment 1a: MP 0.7-2.1
- Route Segment 1c: MP 10.2-10.7
- Route Segment 3b: MP 19.1-19.3 (Interim VRM Class III mitigation)

To minimize the effects of structure dominance as seen from sensitive viewpoints, mitigation measure *VIS-3: Maximize Span Length at Linear Feature Crossings* would be implemented in specific locations as necessary. Mitigation measure VIS-3 would be effective at reducing impacts by placing the structures at the maximum feasible distance from the viewpoint to reduce their dominance in the landscape. This mitigation measure would be implemented in the following locations:

- Route Segment 3b: MP 15.7-15.8, 17.3-17.4, 17.8-17.9, 18.2-18.3, 18.9-19.0, 20.3-20.4
- Route Segment 3c: MP 3.9-4.0, 19.2-19.3 (Interim VRM Class III mitigation), 21.1-21.2, 21.3-21.4, 24.1-24.2

To minimize the effects of structure contrast, mitigation measure *VIS-5: Span Matching of Existing Structures* would be implemented in specific locations as necessary. Mitigation measure VIS-5 would be effective at reducing impacts by grouping transmission structures, reducing impact from high to moderate, or moderate to low. Matching existing spans of transmission line structures would help to consolidate structure contrasts and minimize the proliferation of vertical elements that may be perceived of as introducing a visual “barrier’ in the landscape if they were offset. This mitigation measure would be implemented in the following locations:

- Route Segment 2c: MP 12.6-13.0
- Route Segment 3c: MP16.0-16.2, 17.0-17.9 (Interim VRM Class III mitigation)

To minimize the effects of structure contrast, mitigation measure *VIS-6: Avoid Skylining of Structures* would be implemented in specific locations as necessary. Mitigation measure VIS-6 would be effective at reducing impacts by increasing the landscape “backdropping” that typically reduces the visibility of structures and conductors. This mitigation measure would be implemented in the following locations:

- Route Segment 1b: MP 6.5-6.7
- Route Segment 1c: MP 6.4-6.6
- Route Segment 2d: MP 6.1-6.2
- Route Segment 3c: MP 18.9-19.0, 19.4-19.5 (Interim VRM Class III mitigation)

TABLE 4.8-9 PROJECT RESIDUAL IMPACTS BY ROUTE SEGMENT

ROUTE SEGMENT	RESIDUAL IMPACTS (MILES)		
	LOW	MODERATE	HIGH
1a* 2.2 miles	0	0	18.4
1b* 12.5 miles	4.0	35.2	11.2
1c 12.9 miles	1.2	26.0	24.8
2a* 1.0 mile	0	7.2	0.8
2b 16.4 miles	7.2	58.0	0.4
2c* 18.1 miles	36.8	33.2	2.8
2d* 7.0 miles	2.4	29.6	24.8
3a* 0.1 mile	1.6	0	0
3b 21.7 miles	9.2	47.2	30.8

ROUTE SEGMENT	RESIDUAL IMPACTS (MILES)		
	LOW	MODERATE	HIGH
3c* 25.4 miles	29.6	41.6	30.0

*Route segments that comprise the Agency Preferred Alternative.

4.8.8 Impact Summary by Alternative

4.8.8.1 No Action Alternative

Under the No Action Alternative, the Project would not be built, and no visual impacts would occur. Scenic quality would not be affected and no change would occur to views from residences, recreation areas, travel corridors, or other sensitive viewpoints.

4.8.8.2 Route Alternatives

Table 4.8-10 presents a summary of the residual impact levels for each alternative following the implementation of mitigation measures.

Alternative G would cause the highest total mileage of high residual impacts, and Alternative A would cause the lowest mileage of high residual impacts. High impacts on residences would be highest for Alternative H and lowest for Alternative B. The mileage of high impacts on high sensitivity recreational and travel corridor viewers would be identical and highest for Alternatives B, C, E, and G and identical and lowest for Alternatives A, D (Agency Preferred Alternative), F, and H. Alternatives F and H would have the fewest miles of high impacts on moderate sensitivity recreational and travel viewers. Alternatives B, C, E, and G would be identical and have the fewest miles of high impacts on scenic quality, and Alternative D (Agency Preferred Alternative) would have the fewest miles of moderate impacts on scenic quality. All Alternatives would be compliant with Interim VRM Class III designation, with 100 percent of BLM lands crossed for the Alternatives being compliant.

TABLE 4.8-10 VISUAL RESOURCE RESIDUAL IMPACT SUMMARY BY ALTERNATIVE AFTER MITIGATION

ALTERNATIVE	RESIDUAL IMPACTS (MILES)		
	HIGH	MODERATE	LOW
Alternative A 1a, 1b, 2a, 2b, 2d, 3a, 3c 64.5 miles	15.9	37.9	10.7
Alternative B 1a, 1b, 2a, 2b, 2d, 3a, 3b 61.0 miles	16.1	39.3	5.6
Alternative C 1a, 1b, 2a, 2c, 2d, 3a, 3b 62.8 miles	16.7	33.1	13.0
Alternative D (Agency Preferred Alternative) 1a, 1b, 2a, 2c, 2d, 3a, 3c 66.3 miles	16.5	31.7	18.1
Alternative E 1a, 1c, 2a, 2b, 2d, 3a, 3b 61.4 miles	19.5	37.0	4.9
Alternative F 1a, 1c, 2a, 2b, 2d, 3a, 3c 64.9 miles	19.3	35.4	10.0

ALTERNATIVE	RESIDUAL IMPACTS (MILES)		
	HIGH	MODERATE	LOW
Alternative G 1a, 1c, 2a, 2c, 2d, 3a, 3b 63.2 miles	20.1	30.8	12.3
Alternative H 1a, 1c, 2a, 2c, 2d, 3a, 3c 66.7 miles	19.9	29.4	17.4

4.9 SOCIOECONOMICS

4.9.1 Methods

The socioeconomic impact analysis used data on wages, employment, purchases of goods and services, and total value for the Project Alternatives. These characteristics would be the primary stimulants to the local economy. Workers deriving income from the construction and operation of the project would spend a portion of their wages in the Study Region. These re-spent wages would then re-circulate in the local economy, creating "multiplier," or "ripple" effects, whereby the ultimate increase to local employment and income would be a multiple of the original stimulus (number of jobs, or wages of Project workers, or purchases of goods and services needed for construction). These impacts were quantified through the application of the IMPLAN model (MIG, Inc. 2011) to develop estimates of the initial employment, income and expenditures for goods and services for the Alternatives. IMPLAN is an economic input-output model that is widely used to evaluate the impacts of projects on their regions' economies, providing estimates of impacts on employment, income, and other economic indicators.

The socioeconomic impacts of operation would be minimal because the constructed line would require relatively little operation and maintenance (O&M) expenditure. O&M would largely consist of visual inspection via helicopter and road vehicles, and periodic repair and/or replacement of worn components. The roughly 70 miles of new transmission line would be a small proportion of the proponent's total transmission line mileage, and thus O&M would likely be performed by existing crews, with any apportionment of cost to the Project Alternatives being very small (on the order of one job per year). Thus, the socioeconomic impact analysis did not address operating period impacts, except for its payment of local taxes.

The socioeconomic impact analysis used a "prototype" project, rather than specifically analyzing each of the eight Alternatives, because the Alternatives are so close to one another in terms of total investment and work forces. The primary distinction among the Alternatives in terms of their impacts on employment and income would arise from their location; the Alternatives with activities on the east side of the Columbia River, in Grant County, would create some of their impacts in Grant County, while the other Alternatives would create impacts in Yakima and Kittitas counties, with very little effect in Grant County. The comparative impacts would therefore be functions of line length, which vary little among Alternatives, and whether or not the Alternative is constructed in Grant County. Impacts among Alternatives were qualitatively assessed, based on differences from the impacts of the "prototype" Project.

4.9.2 Estimated Construction Cost (by Alternative)

Estimated construction costs vary slightly among Project alternatives, due to their somewhat different lengths, configuration of poles and roads, terrain, etc. Estimates of the total cost of construction by Alternative indicate a range of $28.6 million (Alternative A) to $31.3 million (Alternative G). As was previously noted, a "prototype project" was used for the socioeconomic impact analysis using IMPLAN. The Prototype Project was Alternative F, which was a midrange Alternative in terms of labor costs. Construction costs are summarized in Table 4.9-1. These estimates show that approximately $13 to $15 million of the total cost of $29 to $31 million would be for purchases of goods and services.

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TABLE 4.9-1 SUMMARY OF MILEAGE BY COUNTY, CONSTRUCTION COSTS, AND LABOR FORCE, BY ALTERNATIVE

ALTERNATIVE	TOTAL MILES	MILES IN BENTON COUNTY	MILES IN GRANT COUNTY	MILES IN KITTITAS COUNTY	MILES IN YAKIMA COUNTY	TOTAL COST	COST PER MILE	LABOR COST	ENGINEERING COST	COST OF PURCHASES	AVERAGE ON-SITE WORKFORCE (PERSONS)	WAGES AND BENEFITS TO WORKERS	WAGES PAID TO LOCALLY-HIRED WORKERS (10%)
A	64.5	3.1	22.8	0	38.6	$28,605,725	$443,500	$13,762,651	$1,871,403	$12,971,672	40.9	$3,574,714	$357,471
B	61	0.7	2.2	9.5	48.6	$30,780,488	$504,598	$13,826,028	$2,013,677	$14,940,783	41.1	$3,591,176	$359,118
C	62.8	0.7	2.2	9.5	50.5	$30,973,053	$493,201	$13,662,636	$2,026,274	$15,284,143	40.6	$3,548,736	$354,874
D (Agency Preferred Alternative)	66.3	3.1	22.8	0	40.3	$28,908,071	$436,019	$13,701,858	$1,891,182	$13,315,031	40.7	$3,558,924	$355,892
E	61.4	0.7	2.2	9.5	49.1	$30,886,605	$503,039	$13,897,532	$2,020,619	$14,968,453	41.3	$3,609,749	$360,975
F	64.9	3.1	22.8	0	39	$28,648,283	$441,422	$13,774,755	$1,874,187	$12,999,342	41.0	$3,577,858	$357,786
G	63.2	0.7	2.2	9.5	50.9	$31,269,843	$494,776	$13,912,339	$2,045,691	$15,311,813	41.4	$3,613,595	$361,359
H	66.7	3.1	22.8	0	40.7	$28,850,000	$432,534	$13,789,562	$1,887,383	$13,173,055	41.0	$3,581,704	$358,170
Average	63.9					$29,865,258	$468,636	$13,790,920	$1,953,802	$14,120,536	41.0	$3,582,057	$358,206

Note: The shaded line indicates the Alternative used as the "prototype project" for the impact analysis.
Source: POWER Engineers 2011a, and calculations by Economic Planning Resources (EPR). EPR assumptions include $35/hour average basic wage rate, average 50-hour work weeks with double-time pay for work over 40 hours, 40 percent value of worker benefits, and 2.2 overhead multipliers by construction contractors.

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4.9.3 Workforce Requirements

The socioeconomic analysis assumed that construction of the Project would require about 55 workers on-site at its peak, including the 44 construction workers enumerated in Table 2-8, and periodic presence of off-site management and inspection personnel. Construction would take one year from start to completion, assumed to occur during calendar year 2013. During that year, the average number of on-site workers would be about 41 construction workers, plus approximately five visiting personnel. Major assumptions are shown in Table 4.9-1.

These workers will not all be present at precisely the same location, however, since construction activities will likely occur at more than one location at a time; as is necessary with transmission line construction, sequencing of access road construction, foundation installation, transmission structure erection, line stringing, testing, and reclamation means that the work site is constantly moving. Construction phasing plans have not been developed, but could entail an overall approach of (1) beginning construction at one substation and proceeding sequentially to completion at the other terminal substation, (2) beginning at both substations and proceeding to a middle point, or (3) construction activities scattered over the route, depending on factors such as terrain, water crossing, etc.

4.9.4 Local Spending on Goods and Services

Local spending for Project construction and by its workers will add to demand for local goods and services, causing further increases in employment and income attributable to the Project as the expenditures are re-spent, re-circulating in the local economy. This creates "ripple," or "multiplier" effects whereby the total impact is a multiple of the original economic stimulus. Purchases of goods and services such as transmission towers, wires, and most electronic components are expected to be made outside the Study Region, and would therefore not contribute to increased local demand. Similarly, wages paid to itinerant workers would mostly increase demand in their home areas, rather than locally, except for their local spending.

4.9.4.1 Project Construction Goods and Services

Very little of the approximately $13 to $15 million in expenditures on materials and services for construction would be spent in the Study Region. This is because major capital items needed for transmission lines and substations are generally not manufactured or sold in the region, but will be purchased from vendors located elsewhere. Local purchases for signage, advertising, aggregate for roads and foundations, construction trailers, miscellaneous business services, and government services are likely, but would be relatively small. Only about $1.8 million of the total prototype project materials and services cost of $13 million would be for locally-provided goods and services. The amounts assumed to be purchased locally are shown in Table 4.9-2.

TABLE 4.9-2 ASSUMED SPENDING ON LOCAL GOODS AND SERVICES FOR CONSTRUCTION

INDUSTRY	PERCENT OF TOTAL NON-LABOR, NON-ENGINEERING COST[1]	PERCENT IN STUDY REGION	TOTAL LOCAL EXPENDITURE	IMPLAN SECTOR #
Aggregate	0.01	100	$100,000	26
Fencing and security	0.29	100	$37,298	3387
Preformed concrete	0.27	50	$17,214	162
Electrical materials	79.58	2	$205,311	266
Misc materials	0.02	75	$2,152	330
Real estate	1.36	100	$175,013	3360
Equipment rental	14.08	50	$908,061	365
Research	0.20	100	$25,822	376

INDUSTRY	PERCENT OF TOTAL NON-LABOR, NON-ENGINEERING COST[1]	PERCENT IN STUDY REGION	TOTAL LOCAL EXPENDITURE	IMPLAN SECTOR #
Advertising and printing	0.76	50	$48,774	377
Signage	0.07	75	$6,455	378
Management consultants	0.56	25	$17,932	374
Temporary hires	1.36	100	$175,013	382
Misc services	0.04	100	$5,738	10005
Fees	1.42	50	$91,810	432
Totals	100.0		$1,816,594	

[1]Source: Wagner 2010, with adjustments to reflect percentages of non-labor, non-engineering costs. Percent local purchases assessed by Economic Planning Resources.

4.9.4.2 Construction Worker Spending

The construction work force was assumed to consist of 90 percent itinerant specialized transmission line construction workers, and 10 percent local hires. Itinerant workers would move to the area for the length of their employment at the site, living primarily in transient accommodations (hotels and RV parks), although a few may seek rental housing. This is an important consideration because wages paid to itinerant workers would mostly be saved, with some of the per diem expenses (for lodging, food, and miscellaneous) paid for by the construction contractor(s). The itinerant workers' saved wages would ultimately be spent outside the Study Region, where the itinerant workers usually live, with only day-to-day living expenses being spent in the Study Region. Locally-hired workers would spend higher proportions of their wages in the Study Region.

In sum, local spending by transient construction workers and site visitors is estimated to total $1.7 million during the year of construction (assumed to be 2013). The assumptions for local spending are shown in Table 4.9-3.

TABLE 4.9-3 SPENDING BY ITINERANT CONSTRUCTION AND OTHER VISITING PERSONNEL

CATEGORY	DAILY EXPENDITURES	CONSTRUCTION TOTAL	IMPLAN SECTOR
Number workers	36.9		
Number visitors	5		
Lodging	$40	$611,153	411
Restaurants	$20	$305,577	413
Entertainment	$10	$152,788	410
Food Stores	$15	$229,182	324
Misc (gas, etc.)	$20	$305,577	330
Car rental (visitors only)	$50	$91,250	362
Total spending onsite workers	$155		
Total daily spending	$4,017		
Annual spending		$1,695,527	

4.9.5 Impact Types

4.9.5.1 Employment

Construction of the Project would provide an average of 41 jobs (peak of about 44) directly on-site for the one year of construction. As the workers re-spend their incomes in the Study Region, and suppliers of goods and services needed to construct the facilities receive additional incomes and re-spend their increases in income on Study Region goods and services, firms in the area would hire more employees to service increased demand. These multiplier, or ripple, effects, would lead to an increase in areal employment above the 41 jobs provided on-site.

4.9.5.2 Income

Like impacts on employment, impacts on income would occur due to re-spending of wages earned by on-site construction workers and related visitors, and due to purchases of local goods and services needed to construct the Project. While construction wages tend to be very high compared to wages in most other industries, a relatively low proportion of construction workers would be hired from the local labor force. Similarly, purchases of local goods and services for construction would be fairly low, since most of the materials (e.g., transmission structures, electrical and electronic components) would need to be purchased from out-of-area vendors.

4.9.5.3 Population and Housing

The increases in employment on-site and its multiplier effects in the Study Region would increase the employment base in the Study Region, thereby increasing opportunities for in-migration (or reducing opportunities for out-migration). Some in-migrating workers would bring dependents (or persons who otherwise would leave the region with their dependents would remain), so that the population impact of the Project would include both workers and their dependents.

Changes in migration, and hence population, would be limited due to three factors:

1) 90 percent of the jobs on-site would be filled by itinerant personnel, who do not typically bring dependents with them for temporary work assignments;
2) Unemployment levels in the region in 2013, the assumed year of construction, are expected to remain high by historical standards, making it more likely that jobs would be filled from the local labor force than by persons in-migrating; and
3) The employment increases, like the construction period, would be temporary.

These factors would limit both population increases, and demands for long-term rental and owner housing. Increased demand for transient housing (hotels and RV spaces) could be noticeable compared to limited availability in the local area.

4.9.5.4 Government Revenue

Local taxes paid due to construction and operation of the facilities will consist of sales and use taxes for materials used in construction, ad valorem property taxes on the value of the facilities, and the Washington Public Utilities Tax. In addition, lease payments for rights-of-way (ROWs) on public lands would be made, including to the U.S. Bureau of Land Management (BLM), the military for use of Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) lands, and U.S. Bureau of Reclamation (Reclamation).

4.9.6 Impact Results and Summary by Alternative

4.9.6.1 No Action Alternative

Under the No Action Alternative, the proposed Project would not be constructed or operated. No impacts on socioeconomics would occur.

4.9.6.2 Impacts

Employment

Impacts on employment would be generally very small under any Route Alternative. The impacts of 41 direct jobs and a total of 88 jobs for the prototype Project would be minimal in the context of total employment in the Study Region of about 170,000 persons. Only very minor differences among Route Alternatives would exist because employment is estimated to vary by so little (40.6 to 41.4 jobs, on average, for one year).

Construction of the Project would provide 41 jobs directly on-site for the one year of construction. As the workers re-spend their incomes in the Study Region, and suppliers of goods and services needed to construct the facilities receive additional incomes and re-spend their increases in income on Study Region goods and services, firms in the area would hire more employees to service increased demand. These multiplier, or ripple, effects, would lead to an increase in areal employment above the 41 jobs provided on-site. The IMPLAN analysis resulted in an estimate of 47.1 additional jobs, for a one-year increase of 88.1 jobs, and a relatively high employment multiplier of 2.15. These impacts are displayed in Table 4.9-4.

It is notable that the ripple effects on employment are relatively high. This is because the relatively high union wages paid to construction workers (and concomitant high local spending) would create a substantial impact per worker as their expenditures recycle in the Study Region economy. Also, much of the impact would be from spending by itinerant workers in restaurants, hotels, food stores, etc., which pay much lower wages than construction. Thus, a fairly large number of jobs would be supported by a fairly low number of on-site workers' incomes.

TABLE 4.9-4 SUMMARY OF IMPACTS ON EMPLOYMENT, INCOME, VALUE ADDED, AND OUTPUT USING IMPLAN

CATEGORY	EMPLOYMENT	LABOR INCOME	TOTAL VALUE ADDED	OUTPUT
Project Alone	41	$4,013,778	$15,648,941	$28,648,283
Ripple Effects:				
Direct Effect (suppliers)	34.8	$1,004,928	$1,743,835	$3,036,853
Indirect Effect (supply chain)	4.8	$203,186	$310,435	$569,514
Induced Effect (re-spending of household income)	7.5	$271,813	$475,723	$791,508
Total Ripple Effects	47.1	$1,479,927	$2,529,993	$4,397,875
Total Impact	88.1	$5,493,705	$18,178,934	$33,046,158
Impact Multiplier	2.15	1.37	1.16	1.15

The impacts described in Table 4.9-4 are totals for the overall Study Region. Some differences in impacts among Alternatives would exist due to the Columbia River, which acts to constrict movement between Yakima and Grant counties. Route Alternatives not involving Grant County (Alternatives B, C, E, and G) would likely result in the bulk of the total Study Region impacts occurring in Yakima and Kittitas counties. The Alternative Routes involving locations in Grant County (Alternatives A, D, F, and H) would likely create greater impacts in Grant County, since nearly half of construction activities, and thus demand for housing, food, and miscellaneous retail goods would take place in Grant County.

Income

The impacts of the Project on labor income would be lower, compared to the original labor income derived from construction, than the impacts on employment. This is due primarily to (1) the lower average wage in affected industries described in the previous section, and (2) to the Project's purchases of labor and materials largely from outside the Study Region (i.e., a relatively small percentage, about 10 percent, of labor and materials expenditures are not recycled in the local economy). Total labor income would increase by $5.5 million, compared to wage and benefit payments of $4 million, for an income multiplier of 1.37.

Impacts on labor income would be similar, compared to the labor income of the Study Region, than impacts on employment. Compared to total personal income of about $11.2 billion in the Study Region in 2009 (Table 3.9-7, Section 3.9.2.4), the total impact of the prototype Project of about $5.5 million would be about 0.05 percent.

Only very minor differences among Alternative Routes would occur because wages paid, and purchases of local goods and services vary by very small amounts.

Population and Housing

Only about four of the on-site construction jobs would be filled by workers from the Study Region labor supply. The remainder, plus the average of about five visiting personnel, would be filled by mobile workers, who would not bring dependents and who would choose transient housing. It is also likely that the firms directly supplying goods and services for construction (aggregate, business services, etc., shown in Table 4.9-2) would recognize the sales to the Project as temporary, and either increase the hours of existing employees, or make temporary hires that would be unlikely to be filled by in-migrants.

The remaining jobs created by Project construction may not be recognized by firms as temporary due to construction, and some in-migration could occur in response to this increase in employment, but limited by the presence of substantial numbers of unemployed local persons who would be more likely to take these jobs. As a high-side estimate, therefore, about 20 jobs created by the project (including the four jobs expected to be filled by local hires, and the 12 by induced and indirect effects shown in Table 4.9-4) could be filled by in-migrants (or by local persons who otherwise would leave the Study Region). As the Study Region employment base increases over time (slow growth is projected), these persons could remain as permanent residents, even after the temporary demand increase due to Project construction is done.

Average household size in the Study Region was 2.88 in 2010 (Table 3.9-4, Section 3.9.2.3). If in-migrants bring with them households of this size, then the population impact of the Project would be about 58 persons. This estimate is high-side because persons who migrate for employment opportunities generally have smaller household sizes than the general population (2010 Census data on household sizes of recent migrants are as yet unavailable). This represents an unnoticeable increase in the Study Region population of 376,100 (0.02 percent).

The supply of rental housing in the Study Region is somewhat tight (and is expected to remain so, as the housing construction sector nationally is expected to continue to recover only very slowly). However, with 4,149 vacant units for sale or for rent in 2010, 2,686 of which were for rent (Table 3.9-4, Section 3.9.2.3), the local rental and ownership housing supply can readily accommodate an increased in demand of about 20 units.

Itinerant workers at the site would add to the temporary population of the Study Region, particularly in nearby communities that have available transient housing. These persons would number an average of about 42 persons: 37 construction workers on-site, plus about five visitors; during the peak period of construction, transient workers would number about 50 persons. Some of the itinerant construction workers would travel via RVs, increasing demand for RV spaces, with the remainder seeking hotel rooms.

As described in Section 3.9.2.3, RV and hotel spaces close to the Alternative Routes are likely to be available only in Yakima and Vantage at either end of the Alternative Routes (with the exception of 10 total RV hookups and 18 hotel rooms at Mattawa, with a vacancy of only a few, at most, in the peak summer/fall months); the central portions of the Alternative Routes are at a distance (approximately an hour drive) from existing RV facilities and hotels except in Mattawa. If demand for RV and hotel units originates in one location along the route (such as if construction proceeds from one end to the other), the demand increase due to the Project could strain the nearby supplies, and workers may have to find hotel or RV spots at greater distance, such as in the Moses Lake and Ellensburg areas, and possibly in the Richland area in Benton County, or share hotel rooms. This potential shortage in availability of RV or hotel accommodations would occur regardless of the Preferred Route. If construction activities occur at two or more locations (such as proceeding simultaneously from each terminus), demand increases would be spread to a larger area of nearby supply, and impacts on hotel and RV supply and demand would be substantially less.

Differences among housing impacts of Alternative Routes would arise from differences in work locations. For Alternatives involving Grant County, higher demand for Grant County housing would occur, and could temporarily be greater than available supply, particularly in the peak summer/fall months. The Alternatives not located in Grant County would not result in appreciable demand for housing in Grant County, and availability of RV and hotel rooms in the area of the Cities of Yakima, Kittitas, and Ellensburg would be sufficient to accommodate demand of up to 52 workers seeking transient accommodations. However, generally longer commuting distances (typically up to about an hour) would be required for the central portions of the Route Alternatives not located in Grant County.

Revenue and Fiscal Effects

Sales and Use Taxes

Sales and use taxes would be paid to the state of Washington and to the counties in which the facilities are constructed. These taxes would apply to the value of purchases of material goods for project construction and by workers at jobs created due to the Project.

An estimated $248,707 in sales and use taxes are expected to be paid due to the project, shown in Table 4.9-5. These estimates are based on the local and state sales and use tax rates, the value of local purchases of Project construction in Table 4.9-1 and itinerant worker spending effects shown in Table 4.9-4, adjusted to reflect likely locations of purchases. The estimates are conservative, however, since they assume spending is taxable at county rates, and do not include spending arising due to the multiplier effects on personal income (and spending) or spending by local residents who work on the construction site.

TABLE 4.9-5 SALES AND USE TAXES PAID TO COUNTIES

	TAX RATE	CONSTRUCTION PURCHASES %	PER DIEM SPENDING %	TAX REVENUE		
				CONSTRUCTION PURCHASES	PER DIEM SPENDING	TOTAL TAXES
Benton County	0.012	0.1	0	$1,744	$0	$1,744
Grant County	0.014	0.1	0	$2,035	$0	$2,035
Kittitas County	0.015	0.05	0.1	$1,090	$2,543	$3,633
Yakima County	0.014	0.75	0.9	$15,259	$21,364	$36,623
State	0.065	1.0	1.0	$94,463	$110,209	$204,672
Total						**$248,707**

Note: Assumes 80% of total project purchases of $1,816,594 are spent on taxable items and all of the total of $1,695,527 of per diem spending is subject to sales and use tax.

Property Taxes

Transmission facilities spanning more than one county in Washington are assessed by the Washington Department of Revenue (WDOR) Utility Section, and property taxes accrue to the counties in which the assessed values are assigned. For preliminary property tax estimating, the capital cost of the facilities shown in Table 4.9-1 are used as proxies for the value of the ultimate assessment by WDOR, along with mileage of ROW in each county. Property tax rates discussed in Section 3.9.2.5 were used, with only the overall county property tax rates used; additional property taxes would be paid to special districts in which Project facilities are located. The resulting estimates of property taxes use current rates and are for the first year of tax payments only; after the first year, assessments would change as factors such as revenue assignable by the State to the facilities and depreciation become important in the actual assessments. The estimates in Table 4.9-6 indicate a total of $258,000 to $300,000 in property taxes would be paid to the counties and the state in the first taxable year. Alternative Route G would result in the most property tax payments, and Alternative A the least. For each Alternative Route, Yakima County would obtain by far the largest property tax income, from $195,000 (Alternative Route A) to $231,000 (Alternative Route G), depending on the Alternative Route.

TABLE 4.9-6 PROPERTY TAXES PAID TO COUNTIES AND STATE, BY ALTERNATIVE ROUTE[1]

	A	B	C	D*	E	F	G	H
Total Cost	$28,605,725	$30,780,488	$30,973,053	$28,908,071	$30,886,605	$28,648,283	$31,269,843	$28,850,000
Total Miles	64.5	61	62.8	66.3	61.4	64.9	63.2	66.7
Benton	3.1	0.7	0.7	3.1	0.7	3.1	0.7	3.1
Grant	22.8	2.2	2.2	22.8	2.2	22.8	2.2	22.8
Kittitas	0	9.5	9.5	0	9.5	0	9.5	0
Yakima	38.6	48.6	50.5	40.3	49.1	39	50.9	40.7
Percent in County								
Benton	4.8%	1.1%	1.1%	4.7%	1.1%	4.8%	1.1%	4.6%
Grant	35.3%	3.6%	3.5%	34.4%	3.6%	35.1%	3.5%	34.2%
Kittitas	0.0%	15.6%	15.1%	0.0%	15.5%	0.0%	15.0%	0.0%
Yakima	59.8%	79.7%	80.4%	60.8%	80.0%	60.1%	80.5%	61.0%
Property Taxes								
Benton	$1,824	$469	$458	$1,793	$467	$1,815	$459	$1,779
Grant	$43,113	$4,733	$4,626	$42,386	$4,719	$42,911	$4,641	$42,047
Kittitas	$0	$5,031	$4,917	$0	$5,015	$0	$4,933	$0
Yakima	$149,916	$214,758	$218,113	$153,878	$216,297	$150,760	$220,543	$154,163
Total Counties	$194,853	$224,990	$228,115	$198,057	$226,497	$195,486	$230,576	$197,989
State	$63,153	$67,954	$68,379	$63,820	$68,188	$63,247	$69,034	$63,692
Total State and Counties	$258,005	$292,944	$296,493	$261,877	$294,685	$258,732	$299,610	$261,681

*Agency Preferred Alternative [1]Note: Property Tax Rates (per $1,000); Benton - 1.3264866; Grant - 1.71933; Kittitas - 1.04942; Yakima - 8.75722582; State - 2.20769

Public Utility Taxes

Public Utility Taxes would accrue to the State due to operation of the Project. However, the impact is assessed as zero. This conclusion follows from the nature of the Public Utility Tax, which is paid on the basis of electricity sales to customers. Electric service is provided essentially according to local demand. The Project Alternatives, or the No Action Alternative, would have no effect on ultimate demand for electricity because if no action were undertaken, other methods to deliver electricity to customers would almost certainly be implemented. Thus, Public Utility Taxes would not change under any Project Alternatives, or the No Action Alternative.

Right of Way Lease Payments

Payments for use of public lands would be made under each alternative, primarily for use of lands under management by Reclamation, BLM, and the JBLM YTC (real estate matters for JBLM YTC are managed by the U.S. Army Corps of Engineers [USACE], Seattle District Office). However, at this preliminary time, no estimates of the amounts of payments to the Reclamation can be made. This is because the Reclamation calculates its "right of use fee" based on the appraised value of land, which is done at the time of an application and cannot be known at this time. However, very little Reclamation land is crossed under any alternative.

The BLM publishes its ROW rent payment schedule. Based on this schedule, an assumed average ROW width of 150 feet, and estimated mileage of BLM land crossed under each Alternative Route, the annual rent payments in 2013 are shown in Table 4.9-7. The rental rates escalate each year by 1.9 percent. These estimates indicate a wide range among Alternative Routes of ROW rent payments to BLM, ($2,113 to $6,854 in 2013) but the amounts are very small relative to BLM rental receipt totals.

TABLE 4.9-7 ESTIMATED ROW RENTAL PAYMENTS TO BLM, 2013

COUNTY	2013 RENT PER ACRE	DISTANCE (MILES)							
		A	B	C	D*	E	F	G	H
		6.1	2.1	1.4	5.4	2.1	6.1	1.4	5.4
Grant	$66.42	4.4	0	0	4.4	0	4.4	0	4.4
Kittitas	$166.06	0	0.4	0.4	0	0.4	0	0.4	0
Yakima	$49.82	1.7	1.7	1	1	1.7	1.7	1	1
		ANNUAL ROW RENT							
Grant		$5,314	$0	$0	$5,314	$0	$5,314	$0	$5,314
Kittitas		$0	$1,208	$1,208	$0	$1,208	$0	$1,208	$0
Yakima		$1,540	$1,540	$906	$906	$1,540	$1,540	$906	$906
Total		$6,854	$2,748	$2,113	$6,220	$2,748	$6,854	$2,113	$6,220
Average ROW width (feet)		150							
Acreage per mile of ROW		18.18							

Source: BLM 2011.
*Agency Preferred Alternative
Note: The per acre rentals will escalate by 1.9 percent annually.

Substantial line distances would traverse the JBLM YTC for Alternative Routes A-D (see Table 2-2 Alternative Route Comparison Summary in Chapter 2), but little or no distance for Alternatives E-H. Payments for use of JBLM YTC land for ROWs would be made for Alternative Routes crossing JBLM YTC lands.

In order to develop the rental price for substantial usage (a substantial use would be approximately over a BLM schedule-based $10,000 annually), the USACE, Seattle District, which is responsible for real estate transactions at the JBLM YTC, would need to assess the fair market value of the land needed for the ROWs. For non-substantial ROW usage, the BLM price schedule used in Table 4.9-7 could be used as a proxy for the ultimate charges for ROW usage on JBLM YTC lands (Petersen 2011).

By using the BLM schedule in Table 4.9-7 and the distances in the JBLM YTC for each alternative (see Table 2-2), it was determined that all Alternative Routes except Alternative Routes F and H would result in payments of over $9,000 annually (for Alternatives F and H, no ROW in JBLM YTC lands would be needed). This substantial use means that the BLM schedule of costs would probably not be a good proxy for the ultimate price charged by the USACE for JBLM YTC ROWs for the Project. In the absence of the appraisal needed upon which to base a preliminary cost estimate, no estimate of the approximate ultimate payments is possible at this time.

The project would have no impacts on hospitals, schools and law enforcement because the project would not cause an increase in the permanent population. Project construction and maintenance activities have the potential to introduce a fire risk in a high-danger zone, primarily dry grassland that is susceptible to wildfire and sparsely populated. Best management practices would be followed by construction and maintenance workers to reduce risk of fires. Low to negligible impacts on local or regional fire fighting services would be expected for all alternatives. Operations and maintenance activities would have no impacts on socioeconomic resources.

Substation equipment upgrades would occur within the existing Pomona Heights and Vantage substation footprints and would have no impact on socioeconomic resources.

4.9.4.2 Impact Summary by Alternative

Table 4.9-8 presents a summary of the impacts for each of the end-to-end Alternative Routes.

Socioeconomic impacts on the Study Region economy would be predominantly beneficial, as job opportunities increase due to any of the Project Alternatives. Impacts as a whole would not perceptively vary among Alternatives. This lack of distinction arises because the scale of construction (duration, employment, and purchases of local goods and services) varies by very little between alternatives, as was shown in Table 4.9-1. For example, average on-site employment would total between 40.6 and 41.4 workers among alternatives, and the total cost of construction would range from $28.6 million to $31.3 million. Such small differences in the initial stimuli to the regional economy caused by the alternatives would not create discernibly different socioeconomic impacts, when viewed region-wide.

The primary distinction in the impacts among alternatives arises from their location. The Columbia River presents a barrier to movement of people and goods between Grant County and Yakima and Kittitas Counties. Work sites located on the Grant County side of the Columbia River can readily be accessed from Grant County residence sites, but have poor access from residence sites across the Columbia River in Yakima and Kittitas counties. As a result, the Alternative Routes that have appreciable distances in Grant County (A, D, F, and H) would bring increased demand for housing, both long term and transient, in Grant County compared to Yakima and Kittitas counties.

Long-term housing supplies (rental and owner housing) are adequate to accommodate small increases in demand under any alternative. However, the Grant County supply of transient housing (RV spaces and hotel rooms) near the Alternate Routes is considerably lower than is the case in Yakima and Kittitas counties. This means some demand for accommodations for transient workers may not be met by available supplies in peak season (Summer and Fall) for RV parks and hotels. At such times, longer commutes from more distant housing may be required, potentially higher prices, and/or sharing of quarters may become necessary for some transient workers. In any event, this impact would be very temporary, and not significant. Furthermore, potential impacts on transient housing availability in Grant County would be offset because more of the region's employment and income benefits would occur in Grant County, and less in Yakima and Kittitas counties, under Alternatives A, D, F, and H.

TABLE 4.9-8 SOCIOECONOMIC IMPACT SUMMARY OF ALTERNATIVES

END-TO-END ALTERNATIVES	IMPACT ON EMPLOYMENT AND INCOME	IMPACT ON POPULATION	IMPACT ON HOUSING	IMPACT ON GOVERNMENT REVENUE[1]
Alternative A 1a, 1b, 2a, 2b, 2d, 3a, 3c 64.5 miles	Impacts approximately equal to Alternative F.	Impacts approximately equal to Alternative F	Impacts approximately equal to Alternative F	-County Property Tax:$194,853 -State Property Tax;$63,153 -BLM ROW Rent:$6,884
Alternative B 1a, 1b, 2a, 2b, 2d, 3a, 3b 61.0 miles	Regional impacts distributed more towards Kittitas and Yakima counties than under Alternative F.	Regional impacts distributed more towards Kittitas and Yakima counties than under Alternative F.	Greater potential for excess transient accommodation demand in Yakima and Kittitas counties than under Alternative F; no potential in Grant County for excess demand.	-County Property Tax:$224,990 -State Property Tax;$67,954 -BLM ROW Rent:$2,748
Alternative C 1a, 1b, 2a, 2c, 2d, 3a, 3b 62.8 miles	Regional impacts distributed more towards Kittitas and Yakima counties than under Alternative F.	Regional impacts distributed more towards Kittitas and Yakima counties than under Alternative .F	Greater potential for excess transient accommodation demand in Yakima and Kittitas counties than under Alternative F; no potential in Grant County for excess demand.	-County Property Tax:$228,115 -State Property Tax;$68,379 -BLM ROW Rent:$2,113
Alternative D (Agency Preferred Alternative) 1a, 1b, 2a, 2c, 2d, 3a, 3c 66.3 miles	Impacts approximately equal to Alternative F.	Impacts approximately equal to Alternative F.	Impacts approximately equal to Alternative F	County Property Tax:$198,057 -State Property Tax;$63,820 -BLM ROW Rent:$6,220
Alternative E 1a, 1c, 2a, 2b, 2d, 3a, 3b 61.3 miles	Regional impacts distributed more towards Kittitas and Yakima counties than under Alternative F.	Regional impacts distributed more towards Kittitas and Yakima counties than under Alternative F.	Greater potential for excess transient accommodation demand in Yakima and Kittitas counties than under Alternative F; no potential in Grant County for excess demand.	County Property Tax:$226,497 -State Property Tax;$68,188 -BLM ROW Rent:$2,748
Alternative F 1a, 1c, 2a, 2b, 2d, 3a, 3c 64.9 miles	Temporary (one year) increase to Study Region employment of 88 jobs, or 0.02 percent of Study Region total employment. Noticeable proportion of jobs in Grant County.	Temporary (one year) Increase to Study Region labor income of $5.5 million, or 0.05 percent of Study Region total personal income Noticeable proportion of jobs in Grant County.	Increase of demand for long-term housing of up to 20 units. Increase in demand for transient (RV or hotel) accommodations of up to 50 spaces/rooms. Potential excess demand in Grant County.	County Property Tax:$195,486 -State Property Tax;$63,247 -BLM ROW Rent:$6,854

END-TO-END ALTERNATIVES	IMPACT ON EMPLOYMENT AND INCOME	IMPACT ON POPULATION	IMPACT ON HOUSING	IMPACT ON GOVERNMENT REVENUE[1]
Alternative G 1a, 1c, 2a, 2c, 2d, 3a, 3b 63.2 miles	Regional impacts distributed more towards Kittitas and Yakima counties than under Alternative F.	Regional impacts distributed more towards Kittitas and Yakima counties than under Alternative F.	Limited potential for excess transient accommodation demand in Yakima and Kittitas counties than under Alternative F; no potential in Grant County for excess demand.	County Property Tax:$230,576 -State Property Tax;$69,034 -BLM ROW Rent:$2,113
Alternative H 1a, 1c, 2a, 2c, 2d, 3a, 3c 66.7 miles	Impacts approximately equal to Alternative F.	Impacts approximately equal to Alternative F	Impacts approximately equal to Alternative F.	County Property Tax:$197,989 -State Property Tax;$63,692 -BLM ROW Rent:$6,220

1 Note: Reliable estimates of the total costs of ROW payments for alternatives that would use JBLM YTC land cannot be made at this time because actual field appraisals by the USACE for JBLM YTC crossings needs to be performed for all alternatives except Alternative Routes F and H.

4.9.7 Mitigation Measures

Impacts on socioeconomic resources are assessed as generally negligible. Impacts such as may occur are mostly characterized as positive (increased demand for local goods and services, employment and income). Some potential for excess demand for transient housing (RV spaces and hotel rooms) could occur closest to the Alternative Routes in the peak summer/fall months, but such impacts would be temporary and ameliorated by market mechanisms if providers raise prices in response to increased demand. Since no appreciable socioeconomic impacts would occur, mitigation measures would not be needed.

4.9.8 Property Values

4.9.8.1 General Property Effects and Compensation

Construction of the proposed Project would require new ROWs that would involve a combination of ROW grants and easements between the Proponent and federal, state and local governments; other companies (e.g., utilities); and private landowners. ROWs for transmission facilities on private lands would be obtained in fee simple or perpetual easement by Pacific Power.

The effect that a transmission line easement may have on property is an issue that would be negotiated between the land owner and the Proponent during the easement acquisition process. The easement acquisition process is designed to provide fair compensation to the landowner for the right to use the property for transmission line construction and operations. Pacific Power would establish land valuation for affected lands based on county assessor valuation, market research (sold property comparison), parcel appraisal, and zonal appraisal information.

The required transmission line easements may encumber the affected ROW area with land use limitations. Each easement would specify the extent of any encumbrances. Typical transmission line easement conditions include the right to clear the ROW and keep clear of trees, structures, including structure-supported crops, brush, vegetation and other potential fire and electrical hazards. Some non-structure supported agricultural crops may be allowed on some easement properties, depending on height.

The impact of introducing a new ROW for transmission structures and lines can vary depending on the placement on the ROW in relation to the property's size, shape and the location of existing improvements. A transmission line may affect the utility of a portion of property if the line effectively severs an area from the remaining property. The introduction of a new transmission line can also have impacts on farms by reducing the acreage available for cultivation and in some cases disrupting existing harvest patterns, with new transmission line structures affecting the farmer's ability to maneuver equipment in the vicinity of the immediately affected area. A new transmission line also has the potential to affect farm operations that employ pivot irrigation systems (See Section 4.4 Land Use and Section 4.16 Public Health and Safety). The Proponents would work with individual landowners to coordinate the timing of construction so as to minimize short-term impacts to agriculture.

The placement of a transmission line across a property also affects the visual quality. Each individual landowner has their own perception of what is visually acceptable or unacceptable (see Section 4.8 Visual Resources). These factors, as well as any other elements unique to the property, are generally taken into consideration during the easement acquisition process.

4.9.8.2 Property Value Impacts

Research into the relationship between electric transmission facilities and local property values has employed research methods that can, for the most part, be divided into surveys and opinion-based studies on the one hand and quantitative studies, largely based on comparisons of market data, on the other.

These studies have resulted in a wide range of findings that reflect the different study approaches employed, as well as the unique characteristics of the particular case or cases being evaluated.

From the 1950s to the late 1980s almost all reported research concluded that transmission lines have little or no effect on property values. More recently, the popular press and academic and professional literature have tended to support the idea that proximity to transmission lines may affect the desirability and therefore the value of residential property (Colwell 1990; Delaney and Timmons 1992; Hamilton and Schwann 1995; Cowger et al.1996). Some observers linked this general change in perspective to increased concerns regarding potential electric and magnetic field (EMF)-related health effects, but a nationwide survey of real estate appraisers suggest that, for the most part, potential negative effects on property values tend to be related to the visual impact of transmission line facilities (Delaney and Timmons 1992). This nationwide survey found that 84 percent of the surveyed appraisers believed that property values are negatively affected by transmission facilities, with an average decrease in value of 10 percent. Ten percent of those surveyed felt transmission lines did not affect property values, while the remaining six percent felt they had a positive impact (Delaney and Timmons 1992).

A recent study "Power Lines and Property Values Revisited" (Pitts and Jackson 2007) concluded that impacts of high voltage transmission lines on the value of residential property has been studied extensively and the impacts are not easily measureable. The study states that research shows the effects of high voltage transmission lines on residential properties are varied and are determined by five interplaying factors: proximity to towers and lines; the view of towers and lines; the type and size of structures; and the appearance of easement landscaping and surrounding topography. Many studies indicate that transmission lines have no significant effect on residential property values. Other studies however, have shown a small diminution in value attributable to the close proximity of the transmission line. Studies report an average discount of between one and ten percent of property value. Reasons cited for the diminution in value include: visual unattractiveness of the lines; potential health hazards; disturbing sounds; and safety concerns. The impacts diminish as the distance from the line increases and disappear at a distance of approximately 200 feet from the lines.

Pitts and Jackson (2007) also interviewed realtors and appraisers in several central California communities. Approximately half of the realtors and appraisers interviewed said they had not observed negative impacts on either residential sale prices or days on the market due to the presence of power lines.

The remaining realtors and appraisers had observed negative impacts on homes adjacent to a power line ROW, with price discounts ranging on average between two and seven percent. Many realtors and appraisers indicated that some buyers may consider power lines an eyesore and a nuisance, but that other buyers did not. One realtor stated that "external factors such as power lines have less of an effect on lower-end homes than on luxury properties." The Pitts and Jackson study (2007) concluded that the impacts from power lines, as well as other negative externalities, depend on many factors, including market condition, location and personal preference.

Another study, "Electric Transmission Lines: Is There an Impact on Rural Land Values?" (Jackson 2010), addresses the potential impacts of transmission lines to rural land used for agriculture or recreational purposes. Jackson studied several hundred sales of rural land in central Wisconsin that involved properties with a transmission line easement for lines ranging in voltage from 115 kV to 345 kV. The general finding of this study showed that there were small (1.11 to 2.44 percent) discounts that could be attributable to the presence of the lines and the encumbrances of the properties by the easements. Neither of these small differences was considered statistically significant.

In a publication, "Environmental Impacts of Transmission Lines" (Public Service Commission of Wisconsin 2009), the Commission indicated that data from studies from the 1950s evaluating the potential change in property values due to the proximity to a new transmission line is often inconclusive. The publication states that a review of the studies indicates that transmission lines have the following effects on property values:

- The estimated reduction in the sale price for single-family homes has ranged from 0 to 15 percent;
- Adverse effect on the sale price of smaller properties could be greater than effects on larger properties;
- Other factors, such as schools, jobs, lot size, house size, neighborhood characteristics, and recreational facilities tend to have a greater effect on sale price than the presence of a transmission line;
- Sale prices can increase where the transmission line ROW is attractively landscaped or developed for recreation (i.e., hiking, hunting, snowmobiling);
- Effects on price and value appear to be greatest immediately after a new transmission line is built or an existing ROW is expanded. These effects appear to diminish over time and over generations of property owners;
- Effects on sale price have most often been observed on property crossed by or adjacent to a transmission line, but effects have been observed for properties farther away from a line;
- Agricultural values are likely to decrease if the transmission line structures are in a location that inhibits farm operations.

Few studies have addressed the impacts of transmission lines on the value of commercial and industrial properties. Those that have done so generally find the impacts are less than the impacts of residential properties. In interviews with appraisers, real-estate brokers, and owners and managers of commercial and industrial parks, Chapman (2005) found for the most part that the presence of a transmission line had little effect on market prices for commercial and industrial properties.

A 2003 Electric Power Research Institute (EPRI) study, " Transmission Lines and Property Values: State of the Science," stated that differences in location and time of data collection, as well as research design, make direct comparisons of results from the various studies very difficult. Although quantitative generalizations from studies cannot be reliably made, the following conclusions from studies seem to be similar across the board (EPRI 2003):

- There is evidence that transmission lines have the potential to decrease nearby property values, but this decrease is usually small.
- Lots adjacent to the ROW often benefit: lots next to adjacent lots often have value reduction.
- Higher-end properties are more likely to experience a reduction in selling price than lower-end properties.
- The degree of opposition to an upgrade project may affect size and duration of the sales-price effects.
- Setback distance, ROW landscaping, shield of visual and aural effects, and integration of the ROW into the neighborhood can significantly reduce or eliminate the impacts of transmission structures on sales prices.
- Although appreciation of property does not appear to be affected, proximity to a transmission line can sometimes result in increased selling times for adjacent properties.
- Sales-price effects are more complex that they have been portrayed in many studies. Even grouping adjacent properties may obscure results.
- Effects of a transmission line on sales process of properties diminish over time and all but disappear in five years.
- Opinion surveys of property values and transmission lines may not necessarily overstate negative attitudes, but they understate or ignore positive attitudes.

The EPRI (2003) study points out that one of the difficulties in determining the impact of property values is the wide range of methodologies used to measure impacts. Unique project characteristics that need to be taken into consideration when assessing the potential effects of transmission line structures on property values include the type and height of the structures, the distance and view from the potentially affected property, intervening topography and vegetation, and the property market and type of landscape involved.

4.10 ENVIRONMENTAL JUSTICE

4.10.1 Methods and Impact Types

Following the guidelines for Environmental Justice evaluations (EPA 2010), the objective of the impact analysis was to identify any populations of minorities or low-income persons that could be disproportionally affected by the Project alternatives. The results of analyses of race/ethnicity and low-income statuses for Census Block Groups in which the Alternative Routes are located, or are within three miles, were summarized in Section 3.10. The primary outcomes of the analysis were that (1) overall, the Alternative Routes traverse some Block Groups with above-average presence of Latinos, but not other minorities, and low-income persons, relative to the four-county Study Area (Benton, Grant, Kittitas, and Yakima counties), and (2) because the set of Census Block Groups traversed by each of the Alternatives is so similar, the distinctions among alternatives are negligible.

This section provides more detail on Environmental Justice impacts by identifying the Census Block Groups that have particularly high proportions of minority or low-income persons.

4.10.2 Impact Level

4.10.2.1 Minority Populations

As previously discussed in Section 3.10, four of the eight Alternative Routes are within 3 miles of the same Census Block Groups as one other Alternative Route, meaning there are only four distinct sets of Block Groups out of the eight Alternative Routes (four sets of duplicate Block Group lists). The Block Groups with particularly high proportions of minority populations were identified. This identification entailed (1) ranking Census Block Groups from highest to lowest presence of minorities, and (2) identifying Block Groups that are outliers in terms of minority population. "Outliers" was defined as having a proportion of a minority over 150 percent of the average percentage for all Block Groups in the Study Area. The resulting list of potentially affected Block Groups included only the Block Groups with over 50 percent Latino population.

Use of the 150 percent threshold for including a Block Group in the list of potentially affected Block Groups was modified slightly, to reflect the absolute size of the non-Latino minority population within each Census Block Group. Block Groups with populations of minorities, excluding Latinos, that were above the 150 percent threshold, but were numerically very small, were examined; as a result, all except one of these Block Groups were excluded from the Block Groups identified as potentially affected. The exception was Block Group 2, Census Tract 1, in Yakima County, which had 5.7 percent population identified as Black or African American, and 7.2 percent identified as American Indian and Native Alaskan. The populations of these two minorities in the Block Group were 115 and 147, respectively, considered large enough to be of concern. In any event, this Block Group would have been included as potentially affected on the basis of its population of Latinos, which also exceeded 150 percent of the Study Area proportion (51.4 percent Latino in the Block Group, versus 32.7 percent in the Study Area). The racial and ethnic compositions of Block Groups that were identified as potentially affected using this criterion are detailed in Table 4.10-1.

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TABLE 4.10-1 POTENTIALLY AFFECTED CENSUS BLOCK GROUPS BASED ON MINORITY POPULATIONS

BLOCK GROUP	TOTAL	HISPANIC OR LATINO		NOT HISPANIC OR LATINO		WHITE ALONE		BLACK OR AFRICAN AMERICAN ALONE		AMERICAN INDIAN AND ALASKA NATIVE ALONE		ASIAN ALONE		NATIVE HAWAIIAN AND OTHER PACIFIC ISLANDER ALONE		SOME OTHER RACE ALONE		TWO OR MORE RACES	
	#	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Block Group 3, Census Tract 114.02, Grant County	5,937	5,481	92.3	456	7.7	408	6.9	12	0.2	10	0.2	5	0.1	-	0.0	10	0.2	11	0.2
Block Group 1, Census Tract 6, Yakima County	1,537	1,269	82.6	268	17.4	204	13.3	27	1.8	15	1.0	2	0.1	-	0.0	-	0.0	20	1.3
Block Group 2, Census Tract 6, Yakima County	2,394	1,901	79.4	493	20.6	392	16.4	32	1.3	20	0.8	7	0.3	-	0.0	-	0.0	42	1.8
Block Group 2, Census Tract 2, Yakima County	1,362	1,051	77.2	311	22.8	251	18.4	12	0.9	21	1.5	5	0.4	-	0.0	-	0.0	22	1.6
Block Group 3, Census Tract 2, Yakima County	1,364	949	69.6	415	30.4	347	25.4	20	1.5	23	1.7	9	0.7	-	0.0	1	0.1	15	1.1
Block Group 4, Census Tract 114.02, Grant County	1,377	946	68.7	431	31.3	410	29.8	-	0.0	12	0.9	3	0.2	-	0.0	1	0.1	5	0.4
Block Group 1, Census Tract 118, Benton County	644	437	67.9	207	32.1	195	30.3	1	0.2	5	0.8	1	0.2	-	0.0	1	0.2	4	0.6

BLOCK GROUP	TOTAL	HISPANIC OR LATINO		NOT HISPANIC OR LATINO		WHITE ALONE		BLACK OR AFRICAN AMERICAN ALONE		AMERICAN INDIAN AND ALASKA NATIVE ALONE		ASIAN ALONE		NATIVE HAWAIIAN AND OTHER PACIFIC ISLANDER ALONE		SOME OTHER RACE ALONE		TWO OR MORE RACES	
	#	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Block Group 1, Census Tract 2, Yakima County	2,827	1,895	67.0	932	33.0	723	25.6	61	2.2	71	2.5	15	0.5	1	0.0	14	0.5	47	1.7
Block Group 1, Census Tract 114.02, Grant County	2,516	1,453	57.8	1,063	42.2	1,021	40.6	4	0.2	3	0.1	6	0.2	-	0.0	2	0.1	27	1.1
Block Group 1, Census Tract 18, Yakima County	1,634	867	53.1	767	46.9	736	45.0	3	0.2	7	0.4	3	0.2	4	0.2	1	0.1	13	0.8
Block Group 1, Census Tract 1, Yakima County	1,061	556	52.4	505	47.6	442	41.7	19	1.8	21	2.0	3	0.3	-	0.0	1	0.1	19	1.8
Block Group 1, Census Tract 21.01, Yakima County	1,950	1,006	51.6	944	48.4	904	46.4	8	0.4	5	0.3	1	0.1	-	0.0	-	0.0	26	1.3
Block Group 2, Census Tract 1, Yakima County	2,034	1,045	51.4	989	48.6	674	33.1	115	5.7	147	7.2	9	0.4	-	0.0	7	0.3	37	1.8
TOTAL, ALL BLOCK GROUPS	**66,237**	**26,794**	**40.5**	**39,443**	**59.5**	**36,539**	**55.2**	**493**	**0.7**	**806**	**1.2**	**421**	**0.6**	**49**	**0.1**	**73**	**0.1**	**1,062**	**1.6**

Note: The highlighted Block Group is included in the list of potentially affected Block Groups for Alternatives C, D, G, and H only. The remaining Block Groups are potentially affected for all Alternative Routes.

Only the minority group of Latinos was present to a greater degree in the Block Groups as a whole than in the general population of the four-county Study Area. This remained true in the analysis of individual Alternative Routes, with the exception of Block Group 2, Census Tract 1 described above, which had additional high proportions of two other minority groups.

The use of the 150 percent threshold/substantial population criteria for including a Block Group as potentially affected created lists of potentially affected Block Groups that are identical to those that would have resulted by searching for "break points" in the data. There was a remarkable break in the ranked proportions of persons of Latino heritage in the 32 to 50 percent range; percentages of Latino populations in Block Groups can be readily grouped as being below 32 percent, or above 50 percent, with no percentages in between. This break suggests that under 32 percent, the proportion of Latinos could be due to typical sample variation (that could result solely from random chance) and therefore not unusual. On the other hand, for those Block Groups with over the 50 percent proportion of Latino population, the Block Group population could be considered to constitute a disproportionate percentage of Latino population.

Using this criteria, the list of potentially affected Census Block Groups was identical for four Alternative Routes, and only slightly different for the other four Alternative Routes in that Census Block Group 1, Census Tract 21.01 was included as potentially affected.

Having identified the potentially affected Block Groups, the populations within each Block Group were examined in greater detail. The result was that with two exceptions, in no case were there appreciable concentrations of minority persons within a mile of the Alternative Routes. The exceptions were the small incorporated community of Beverly in Grant County, which is located about a mile from Route Segments 3b and 3c (Agency Preferred Alternative), although separated from Route Segment 3b by the Columbia River. Although Beverly has a high proportion of persons of Latino heritage, the absolute number is very small (under 50). Furthermore, at a one-mile distance from any Alternate Route, visual impacts from Beverly residences would be very low.

At the eastern terminus (the Pomona Heights substation), the Alternate Routes all approach the substation from the east. There is no concentration of persons of Latino heritage or other minorities due east of the Pomona Heights substation. To the west of the Pomona Heights substation, appreciable population is no closer than a mile, with the City boundary for Selah about a mile away.

4.10.2.2 Low Income Populations

As described in Section 3.9.4, overall, the Project area has somewhat more poverty than the four-county Study Area (Benton, Grant, Kittitas, and Yakima counties). The four-county area population included 16.5 percent of persons who had incomes below the poverty level in 1999. For all Census Block Groups within three miles of any Alternative Route, the percentage was 19.5. The distinction among Alternative Routes was very small, with A, B, E, and F being identical at 19 percent of their proximate population having incomes below the poverty level, and the other Alternative Routes having 19.5 and 19.6 percent. Similarly, using the threshold of population living under twice the poverty level, the area within three miles of any Alternative were generally poorer than in the Study Area as a whole.

As with the analysis for race and ethnicity, the next step in the evaluation was to examine each Alternative Route and develop lists of potentially affected Block Groups. Block Groups for each Alternative Route were ranked according to the percentages living in poverty. Block Groups with 150 percent of the proportion of persons with incomes below the poverty threshold were selected as potentially affected. With the Study Area proportion being 16.5 percent, this meant selection of Block Groups with over 24.7 percent of their population with incomes below the poverty level.

The resulting list of potentially affected Block Groups was the same for every Alternative Route, with one exception: for Alternative Routes C, D (Agency Preferred Alternative), G and H, one additional Block Group was added as potentially affected -- Block Group 1, Census Tract 21. All other potentially affected Block Groups applied to all eight Alternative Routes. These results are displayed in Table 4.10-2.

TABLE 4.10-2 POTENTIALLY AFFECTED CENSUS BLOCK GROUPS BASED ON POPULATIONS WITH INCOMES BELOW POVERTY LEVEL

BLOCK GROUP	TOTAL	BELOW POVERTY LEVEL		BELOW 1.5 TIMES POVERTY LEVEL		BELOW TWICE POVERTY LEVEL	
	#	#	%	#	%	#	%
Block Group 2, Census Tract 1, Yakima County	1,043	561	53.8%	755	72.4%	769	73.7%
Block Group 1, Census Tract 1, Yakima County	868	441	50.8%	635	73.2%	678	78.1%
Block Group 1, Census Tract 6, Yakima County	1,305	631	48.4%	896	68.7%	943	72.3%
Block Group 2, Census Tract 6, Yakima County	2,319	1,068	46.1%	1,439	62.1%	1,571	67.7%
Block Group 1, Census Tract 2, Yakima County	2,512	1,053	41.9%	1,755	69.9%	1,823	72.6%
Block Group 3, Census Tract 2, Yakima County	1,358	501	36.9%	665	49.0%	728	53.6%
Block Group 2, Census Tract 2, Yakima County	1,395	480	34.4%	765	54.8%	801	57.4%
Block Group 1, Census Tract 9814, Grant County	1,234	422	34.2%	747	60.5%	879	71.2%
Block Group 1, Census Tract 21, Yakima County	2,133	685	32.1%	1,264	59.3%	1,360	63.8%
TOTAL POPULATIONS		**5,842**		**8,921**		**9,552**	

Note: The highlighted Block Group is included in the list of potentially affected Block Groups for Alternatives C, D, G, and H only. The remaining Block Groups are potentially affected for all Alternative Routes.

Having identified the potentially affected Block Groups, the populations within each Block Group were examined in greater detail. The result was that with a few exceptions, in no case were there appreciable low-income communities within a mile of the Alternative Routes. The exceptions were the small incorporated community of Beverly in Grant County, which is located about a mile from Route Segments 3b and 3c (Agency Preferred Alternative), although separated from Route Segment 3b by the Columbia River. Although Beverly had a high proportion of low-income persons in 1999, the absolute number was very small (under 50 persons). At the eastern terminus (the Pomona Heights substation), the Alternate Routes all approach the substation from the east. There is no low-income population due east of the Pomona Heights substation. To the west of the Pomona Heights substation, appreciable population is no closer than a mile, with the City boundary for Selah about a mile away.

4.10.3 Impact Results and Summary by Alternative

4.10.3.1 No Action Alternative

Since no construction or operations would occur, no impacts on Environmental Justice would occur under the No Action alternative.

4.10.3.2 Impacts

Impacts of the Project Alternatives on Environmental Justice would be insignificant. Some potential impact on the unincorporated community of Beverly is possible under each Alternative, particularly those using Route Segment 3c (Alternative Routes A, D [Agency Preferred Alternative], F, and H). However, the impact on this small population of minority and/or low-income persons is assessed as minimal due to distance from the transmission line Alternative Routes and the very small absolute size of the minority and/or low-income population of Beverly. Impacts do not differ appreciably by Alternative Route.

4.10.3.3 Impact Summary by Alternative

Because the Alternative Routes and areas within a three mile radius include almost identical Census Block Groups, at the Block Group level of analysis, only very minor differences in impacts on Environmental Justice were evident. The differences in impact among Alternatives consist of the addition of one Census Block Group with disproportionate populations of minorities and/or low-income persons, for Alternative Routes A, D (Agency Preferred Alternative), F, and H. These impacts are summarized in Table 4.10-3.

However, Census Block Groups in rural areas such as most of the local area are very large; in many cases most of the area of the Block Groups is outside a 3-mile distance from the Alternative Routes. Thus, the presence of a statistically large proportion of minority and/or low-income persons in the Block Groups does not necessarily mean that there are concentrations of such communities actually in proximity to the Alternative Routes. Upon closer examination of the potentially affected Census Block Groups, it was determined that no significant impacts on Environmental Justice would occur under any Alternative.

TABLE 4.10-3 ENVIRONMENTAL JUSTICE IMPACT SUMMARY OF ALTERNATIVES

END-TO-END ALTERNATIVES	QUANTITATIVE DATA	
	IMPACT ON RACIAL OR ETHNIC MINORITIES	IMPACT ON LOW-INCOME PERSONS
Alternative A 1a, 1b, 2a, 2b, 2d, 3a, 3c 64.5 miles	12 Census Block Groups identified as potentially affected. However, closer examination revealed no substantial number of minorities within a mile of any Alternative. No significant impact.	8 Census Block Groups identified as potentially affected. However, closer examination revealed no substantial number of low income persons within a mile of any Alternative. No significant impact.
Alternative B 1a, 1b, 2a, 2b, 2d, 3a, 3b 61.0 miles	12 Census Block Groups identified as potentially affected. However, closer examination revealed no substantial number of minorities within a mile of any Alternative. No significant impact.	8 Census Block Groups identified as potentially affected. However, closer examination revealed no substantial number of low income persons within a mile of any Alternative. No significant impact.

END-TO-END ALTERNATIVES	QUANTITATIVE DATA	
	IMPACT ON RACIAL OR ETHNIC MINORITIES	IMPACT ON LOW-INCOME PERSONS
Alternative C 1a, 1b, 2a, 2c, 2d, 3a, 3b 62.8 miles	Slightly higher impact from Alternatives C, D, G and H due to inclusion of one additional potentially affected Block Group of minority persons. However, no significant impact for any Alternative Route.	Slightly higher impact from Alternatives C, D, G and H due to inclusion of one additional potentially affected Block Group of low-income persons. However, no significant impact for any Alternative Route.
Alternative D (Agency Preferred Alternative) 1a, 1b, 2a, 2c, 2d, 3a, 3c 66.3 miles	Slightly higher impact from Alternatives C, D, G and H due to inclusion of one additional potentially affected Block Group of minority persons. However, no significant impact for any Alternative Route.	Slightly higher impact from Alternatives C, D, G and H due to inclusion of one additional potentially affected Block Group of low-income persons. However, no significant impact for any Alternative Route.
Alternative E 1a, 1c, 2a, 2b, 2d, 3a, 3b 61.3 miles	12 Census Block Groups identified as potentially affected. However, closer examination revealed no substantial number of minorities within a mile of any Alternative. No significant impact.	8 Census Block Groups identified as potentially affected. However, closer examination revealed no substantial number of low income persons within a mile of any Alternative. No significant impact.
Alternative F 1a, 1c, 2a, 2b, 2d, 3a, 3c 64.9 miles	12 Census Block Groups identified as potentially affected. However, closer examination revealed no substantial number of minorities within a mile of any Alternative. No significant impact.	8 Census Block Groups identified as potentially affected. However, closer examination revealed no substantial number of low income persons within a mile of any Alternative. No significant impact.

4.10.4 Conclusion

No significant impacts on minority or low-income populations are expected with implementation of any of the Project Alternatives. Although some of the Census Block Groups within three miles' proximity of the Alternative Routes do contain substantial populations of minority and low-income populations, appreciable concentrations of such populations are more distant than about a mile, limiting the potential impact of the Project Alternatives to no more than minimal, and not significant. Differences in impacts among Alternative Routes would be extremely small.

4.11 CULTURAL RESOURCES AND NATIVE AMERICAN CONCERNS

4.11.1 Methods and Impact Types

4.11.1.1 Analysis Methods

The impact assessment methods used in this section are consistent with the requirements of the National Environmental Policy Act (NEPA), the Washington State Environmental Policy Act (SEPA) and Section 106 of the National Historic Preservation Act (NHPA), the principal federal law protecting cultural resources. Under 36 Code of Federal Regulations (C.F.R.) 800, the regulations implementing Section 106, federal agencies are encouraged to coordinate compliance with Section 106 and NEPA (36 C.F.R. 800.8(a)(1)). Under both NEPA and Section 106, the process entails identifying cultural resources potentially impacted by a project, determining the impacts of the project, and identifying measures to avoid, reduce, or otherwise mitigate those impacts.

The results of the first step, identifying cultural resources known to exist near each alternative, were presented in section 3.11 and in Tables 3.11-2 and 3.11-3.

Under Section 106, a federal agency must consider the effects of its undertakings on historic properties (properties that are listed in or eligible to the National Register of Historic Places (National Register). Cultural resources that are not eligible to the National Register may also be considered under one or more of other cultural resource authorities (e.g., Archaeological Resources Protection Act; Native American Graves Protection and Repatriation Act; American Indian Religious Freedom Act; and Executive Order 13007, Indian Sacred Sites). For this analysis, resources that are listed in or eligible to the Washington Heritage Register are also considered.

The National Register is a list of the nation's historically significant properties determined to be worthy of preservation, although not all properties worthy of preservation are listed in the National Register. To be considered eligible to the National Register, resources must be determined significant under one or more of four criteria established by the Secretary of the Interior in 36 C.F.R. 60.4:

A. Are associated with events that have made a significant contribution to the broad patterns of history;
B. Are associated with the lives of persons significant in the past;
C. Embody the distinctive characteristics of a type, period, or method of construction, represent the work of a master, possess high artistic value, or represent a significant and distinguishable entity whose components may lack individual distinction; or
D. Have yielded, or may be likely to yield, information important in prehistory or history.

To be listed in, or determined eligible for listing in, the National Register, not only must a cultural resource meet one or more of the four criteria, it must also possess integrity. Integrity is defined as the authenticity of a resource’s prehistoric or historic identity based on the survival of physical characteristics that existed during its period of use. The National Register recognizes seven aspects of integrity: location, design, setting, materials, workmanship, feeling, and association. Integrity of location means that the resource has not been moved from its historical location. Integrity of design, materials, and workmanship mean that the resource’s original building materials, plan, shape, and design elements remain intact. Integrity of setting means that the surrounding landscape has changed very little since the resource’s period of importance. Integrity of feeling and association means the resource retains a link to an earlier time and place and is able to evoke that era.

Cultural resources must generally be at least 50 years old to be eligible to the National Register; however, certain cultural resources associated with more recent, exceptionally important events (e.g., the development of nuclear energy) may also be considered eligible.

Because most of the cultural resources in the study area have not been evaluated for National Register eligibility (see Tables 3.11-2 and 3.11-3), for this analysis cultural resources are assumed to be eligible to the National Register unless they have been determined by a federal agency or the Washington State Historic Preservation Officer (SHPO) to be ineligible or if they are isolated artifacts (e.g., a single tin can, a single chipped stone tool). Isolated artifacts are usually determined ineligible to the National Register.

The second step, assessing impacts, includes describing impact criteria and the types of impacts to cultural resources caused by construction of a transmission line and related facilities (sections 4.11.1.2 and 4.11.1.3). This step also includes a summary of the cultural resources that could potentially be impacted (section 4.11.4).

Section 4.11.5 presents the third step, mitigation measures.

4.11.1.2 Impact Criteria

For cultural resources, including archaeological sites, architectural resources, traditional cultural properties (TCPs) and other sites of concern to Native Americans, an adverse effect (equivalent to an impact under NEPA) occurs when a project may alter, directly or indirectly, any of the characteristics of the resource that qualify it for inclusion in the National Register. Adverse effects include, but are not limited to:

- Physical destruction of or damage to all or part of the property;
- Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access, which is not consistent with the *Secretary of the Interior's Professional Standards for the Treatment of Historic Properties* and applicable guidelines;
- Removal of the property from its historic location;
- Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance;
- Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features;
- Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian Tribe or Native Hawaiian organization; and
- Transfer, lease, or sale of property out of federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

For the Vantage to Pomona Heights 230 kilovolt (kV) Transmission Line Project, the mostly likely types of adverse effects are: 1) physical destruction or damage (physical impacts); 2) change in the resource's character or setting (visual impacts); and 3) the introduction of visual elements that diminish the resource's integrity (visual impacts).

Cultural resources that are eligible or potentially eligible to the National Register under Criteria A (event), B (person), or C (distinctive characteristics) may be subject to both physical impacts (or effects) and visual impacts (or effects). Most resources eligible under these three criteria are architectural resources and TCPs; less frequently are they archaeological sites. Cultural resources that are eligible to the

National Register only under Criterion D (information) are usually not impacted by visual intrusions, because changes in visual setting would not be expected to reduce a cultural resource's potential to yield information important in prehistory or history. Archaeological sites are usually evaluated under Criterion D; architectural resources and TCPs are less frequently evaluated under Criterion D.

4.11.1.3 Impact Types

Cultural resources within the Project area could be subject to both direct and indirect impacts.

Direct physical impacts could result from ground disturbing activities associated with installing single pole and H-frame structures; grading or widening access roads; preparing and using pulling and tensioning sites, staging areas, and other temporary use areas; geotechnical drilling; and implementing restoration and re-vegetation measures. Ground disturbance could disturb archaeological sites and TCPs. Architectural resources could also be subject to physical disturbance, but very few buildings and structures have been identified in areas of potential construction activity.

For the proposed Project, regardless of alternative, construction would include both short-term or temporary ground disturbance and long-term or permanent ground disturbance (see Chapter 2). Because cultural resources are non-renewable, any ground disturbance, whether short-term or long-term, is considered permanent.

Direct visual impacts could result when single-pole and H-frame structures are installed near visually sensitive cultural resources that have retained their integrity of setting. For this analysis, it is assumed that visually sensitive cultural resources could include archaeological sites and TCPs with petroglyphs, pictographs, burials, talus pits, rockshelters, and rock features (e.g., cairns, linear alignments). Some types of architectural resources could also be visually impacted by the presence of a transmission line.

Indirect physical impacts to cultural resources may occur when public accessibility is increased to a previously remote area because of improved roads. Improved access may lead to increased vandalism at archaeological sites, architectural resources and TCPs.

For this analysis, it is assumed that cultural resources within 75 feet of the centerline of a route alternative would potentially be subject to both physical and visual impacts. It is assumed that cultural resources more than 75 feet from the centerline could potentially be subject to visual impacts and indirect physical impacts, but not direct physical impacts.

The Washington Department of Archeology and Historic Preservation (DAHP) Washington Information System for Architectural and Archaeological Records Data (WISAARD) database also includes buffers of various sizes around most archaeological sites. For this analysis it is recognized that sites recorded within 750 feet of the centerline may have buffers that extend to within 75 feet of the centerlines, but these buffers are not addressed in the analysis for this EIS. It is acknowledged that:

- Site boundaries are sometimes not well defined;
- Site data may change as nearby projects increase the number of known sites in the Project vicinity;
- The Yakama Nation Cultural Resources Program is currently conducting cultural resource surveys on Federal land and will survey private land where permission is granted, so that more accurate data on site number, site boundaries, site types, and site significance will be available for the Final EIS.

Previously undocumented archaeological sites discovered during construction (see Section 4.11.5) may require that construction activities be shifted more than 75 feet from the centerline to avoid impacts.

4.11.2 Impact Levels (High, Moderate, Low, No Identifiable Impact)

The impact levels for the cultural resource impact assessment are defined as follows:

High
A high level of impact to cultural resources would result if the construction, operation, or maintenance of the transmission line has the potential to cause a significant or substantial ground disturbance or adverse visual change to known cultural resources that are listed in or eligible for the National Register; to cultural resources that have not been evaluated for National Register eligibility; and on land with a high potential for containing cultural resources that has not been surveyed for cultural resources.

Moderate
A moderate impact to cultural resources would result if the construction, operation, or maintenance of the proposed Project would cause ground disturbance or visual changes on land with a moderate potential for containing cultural resources that has not been surveyed for cultural resources.

Low
A low impact to cultural resources would result if the construction, operation, or maintenance of the proposed Project would potentially cause any amount of ground disturbance or visual change on land that has been surveyed for cultural resources and that appears not to contain any cultural resources, or land that has not been surveyed for cultural resources but has a low potential for containing any.

No Identifiable Impact
No identifiable impact would be indicated where no measurable or suspected adverse impact would occur to any cultural resources. These areas would include only land where past disturbance, either human-caused or natural, precludes any possibility of containing intact cultural resources.

Other factors could be used to differentiate the level of impacts on cultural resources (e.g., site density, site size, site type). However, inconsistencies over the past 50 years in how data were recorded by archaeologists means that such an analysis might not be reliable.

4.11.3 Impacts Common to All Route Segments

Physical Impacts
Because there has been very limited cultural resource survey in the vicinity of most of the route segments, and no survey at all along some of the route segments, it can be assumed that the Project has the potential to cause physical damage to archeological sites in each of the route segments. Even after areas have been surveyed for cultural resources, there would be potential for undiscovered cultural resources because some archaeological sites are obscured by vegetation or are deeply buried. Physical damage to architectural resources is not expected to occur in any of the route segments because there would be no buildings within 75 feet of the centerline of any route segment except for the Vantage substation.

Visual Impacts
Because most archaeological sites that are determined to be eligible to the National Register have received that determination because of their potential to contain important information about our past (Criterion D), changes in visual setting at an archaeological site would be unlikely to be considered an impact. Therefore, none of the route segments would have visual impacts on archaeological sites that are eligible to the National Register only under Criterion D.

Visual impacts to architectural resources and TCPs that are eligible to the National Register are possible in each of the route segments.

Native American Concerns
Transmission structures have the potential to cause visual impacts on resources of special concern to Native Americans. Such resources have not been identified for each route segment, but consultation by the U.S. Bureau of Land Management (BLM) is on-going. Refer to Section 3.11.4.5 for more information on Native American Rights and Interests.

4.11.4 Impacts to Specific Route Segments

Cultural resources occur within 750 feet of the centerlines that have DAHP-defined buffers that may extend into the 75-foot corridor. These buffers are not included in the analysis.

4.11.4.1 Route Segment 1a (Agency Preferred Alternative)

Route Segment 1a is 2.2 miles long. Within one mile of the segment there has been very limited cultural resource survey, and the few surveys that have been done have revealed a low density of cultural resources except on land close to the Yakima River. Along the river, large, complex prehistoric archaeological sites have been recorded. Farther from the river, prehistoric archaeological sites are typically lithic scatters (i.e., concentrations of stone flakes or tools on the ground surface) and often occur near ephemeral drainages. No historic-period archaeological sites or architectural resources are recorded within one mile of Route Segment 1a, but unrecorded historic resources, if they exist, would be most likely to occur near roads.

Physical Impacts
Short-term and long-term ground disturbance along this route segment would total 12.0 acres. None of the land within 75 feet of the centerline of Route Segment 1a has been previously surveyed for cultural resources and there are no previously recorded cultural resources within this area. Because of the generally low density of prehistoric archaeological sites in nearby areas, physical impacts are anticipated to be low, with a somewhat higher probability of encountering sites near drainages. The transmission line would run next to Sage Trail Road for most of this segment, so there is a low to moderate potential for historic archaeological sites. There would be no physical impacts to architectural resources.

Overall, the potential for physical impacts to cultural resources along Route Segment 1a would be low to moderate.

Visual Impacts
Little of the land within one mile and none of the land within 250 feet of the centerline of Route Segment 1a had been previously surveyed for cultural resources. There are no previously recorded cultural resources within 250 feet of the centerline and few within one mile.

Undiscovered archaeological sites, should they exist, would probably not be visually sensitive, and there are no documented architectural resources in the area. Also, the presence of the existing Pomona-Wanapum 230 kV transmission line, Pomona Heights to Union Gap 230 kV transmission line, and Pomona-Heights substation would likely have already compromised integrity of setting for visually sensitive resources identified in the future.

Visual impacts are anticipated to be low.

Native American Concerns
The Yakama Nation Cultural Resource Program (YNCRP) has identified only one resource of special concern in the vicinity of Route Segment 1a. The resource is located approximately three miles from the centerline of this route segment. However, the integrity of the visual setting has been compromised by residential development near the city of Selah, the interstate highway, the Burlington Northern and Santa Fe railroad, and Joint Base Lewis-McChord Yakima Training Center (JBLM YTC). Therefore, impacts to the resource are expected to be low (Lally and Camuso 2011).

4.11.4.2 Route Segment 1b (Agency Preferred Alternative)

Route Segment 1b is just within the JBLM YTC border and parallels an existing firebreak road. It is 12.5 miles long. There has been very limited cultural resource survey within one mile of the segment and seven cultural resources recorded; all prehistoric lithic scatters except for a very small historic-period site. Many of these sites are found along ephemeral drainages.

Physical Impacts
Short-term and long-term ground disturbance along this route segment would total 57.9 acres. None of the land within 75 feet of the centerline of Route Segment 1b has been previously surveyed for cultural resources and there are no previously recorded cultural resources within 75 feet of the centerline. If archaeological resources exist along Route Segment 1b, they would most likely be along drainages. There would be no physical impacts to architectural resources.

Overall, the potential for physical impacts to cultural resources is low, with a somewhat higher potential for impacts near drainages.

Visual Impacts
Little of the land within one mile and none of the land within 250 feet of the centerline of Route Segment 1b had been previously surveyed for cultural resources. The only recorded cultural resources within one mile are archaeological sites, which are unlikely to be sensitive to changes in visual setting.

Visual impacts are anticipated to be low because undiscovered archaeological sites, should they exist, would probably not be visually sensitive, and there are no recorded architectural resources.

Native American Concerns
The YNCRP has identified six resources of special concern in the vicinity of Route Segment 1b. However, as discussed for Route Segment 1a, the integrity of the visual setting has been compromised. The resources are located 3 to 7 miles from the centerline of this route segment. Impacts to the resources from the presence of a new transmission line are expected to be low (Lally and Camuso 2011).

4.11.4.3 Route Segment 1c

Route Segment 1c is on private land just outside JBLM YTC and parallels the installation boundary. It is 12.9 miles long and is very close to and just south of Route Segment 1b. As with Route Segment 1b, there has been very limited survey within 1 mile of Route Segment 1c. Seven cultural resources have been recorded, six prehistoric lithic scatters and one historic site. Many of these sites were found along ephemeral drainages.

Physical Impacts
Short-term and long-term ground disturbance along this route segment would total 70.9 acres under Access Model A and 56.0 acres under Access Model B (see Chapter 2). None of the land within 75 feet of the centerline of Route Segment 1c has been previously surveyed for cultural resources and there are no previously recorded cultural resources in the area. If archaeological sites exist along Route Segment

1b, they would most likely be near drainages. There would be no physical impacts to architectural resources.

Overall, the potential for physical impacts to cultural resources is low, with a somewhat higher potential for impacting archaeological sites near drainages.

Visual Impacts
Little of the land within one mile and none of the land within 250 feet of the centerline of Route Segment 1c had been previously surveyed for cultural resources. The only recorded cultural resources within one mile are archaeological sites, which are unlikely to be sensitive to changes in visual setting.

Visual impacts are anticipated to be low because undiscovered archaeological sites, should they exist, would probably not be visually sensitive, and there are no recorded architectural resources.

Native American Concerns
The six resources of special concern located near Route Segment 1b are also located in the vicinity of Route Segment 1c. The resources are located 3 to 7 miles from the centerline of this route segment. However, as discussed for Route Segment 1a and 1b, the integrity of visual setting has been compromised by extensive development in the areas. Therefore, impacts to the resources from the presence of a new transmission line are expected to be low (Lally and Camuso 2011).

4.11.4.4 Route Segment 2a (Agency Preferred Alternative)

Route Segment 2a is only 1.0 mile long. There have been no surveys within a mile and only one small lithic scatter recorded within one mile. The terrain and environmental conditions are similar to those of Route Segments 1b and 1c, although this segment roughly parallels for its entire length an ephemeral drainage 100 to 500 feet to the west.

Physical Impacts
Short-term and long-term ground disturbance along this route segment would total 6.0 acres. None of the land within 75 feet of the centerline of Route Segment 2a has been previously surveyed for cultural resources and there are no previously recorded cultural resources within 75 feet. Physical impacts are anticipated to be low to moderate because archaeological site densities in nearby areas appear to be low except possibly near drainages. There would be no physical impacts to architectural resources.

Overall, the potential for physical impacts to cultural resources is low to moderate.

Visual Impacts
Little of the land within one mile and none of the land within 250 feet of the centerline of Route Segment 2a had been previously surveyed for cultural resources. The only recorded cultural resource within one mile is a small prehistoric archaeological site, which is unlikely to be sensitive to changes in visual setting.

Visual impacts are anticipated to be low because undiscovered archaeological sites, should they exist, would probably not be visually sensitive, and there are no recorded architectural resources.

Native American Concerns
The six resources of special concern located near Route Segment 1b and 1c are also located in the vicinity of Route Segment 2a but are located at a greater distance from this route segment (Lally and Camuso 2011). Therefore, impacts are expected to be low.

4.11.4.5 Route Segment 2b

Route Segment 2b is 16.4 miles long. The terrain along this segment is more pronounced that to the east, with deeper drainages and more surface relief. While the DAHP WISAARD database does not indicate extensive systematic and intensive cultural resource surveys within one mile of the centerline of Route Segment 2b, at least 36 cultural resources have been recorded in the same area. Most of these are on JBLM YTC. Prehistoric archaeological sites are generally lithic scatters, although there is at least one burial site and at least one talus pit. Historic sites include trash scatters and the remains of houses and homesteads. There are no recorded architectural resources. A few of the cultural resources are considered potentially eligible to the National Register.

Physical Impacts
Short-term and long-term ground disturbance along this route segment would total 95.3 acres under Access Model A and 84.5 acres under Access Model B (see Chapter 2). Only 0.3 percent of the land within 75 feet of the centerline of Route Segment 2b has been previously surveyed for cultural resources and there are no previously recorded cultural resources within 75 feet of the centerline. While the density of cultural resources appears to be low, some archaeological sites in the general vicinity have been recommended as potentially eligible to the National Register, there is also a known burial site 0.85 mile from the centerline, and a talus pit 0.6 mile from the centerline, all of which suggest that similar resources could exist within 75 feet of the centerline. There would be no physical impacts to architectural resources.

Physical impacts are anticipated to be low to moderate.

Visual Impacts
Only 0.5 percent of the land within 250 feet of the centerline of Route Segment 2b has been previously surveyed for cultural resources and there are no previously recorded cultural resources within 250 feet. Undiscovered archaeological sites, should they exist, would typically not be visually sensitive, but a prehistoric burial site within 0.85 mile and a talus pit within 0.6 mile could potentially be visually impacted by the presence of a transmission line. There are no documented architectural resources within a mile.

Visual impacts are anticipated to be low to moderate.

Native American Concerns
The YNCRP has not identified any sites of special concern along Route Segment 2b (Lally and Camuso 2011). Therefore, impacts are expected to be low.

4.11.4.6 Route Segment 2c (Agency Preferred Alternative)

Route Segment 2c is 18.1 miles long. Much of the land along this segment is privately owned, so there has been only limited cultural resource survey within one mile of the centerline. In addition, unlike Route Segment 2b, where there is little cultivated land, over 35 percent of Route Segment 2c crosses cultivated land. Although mechanized agriculture may have impacted surface remains, subsurface archaeological remains may still be present and intact below the plow zone. On the non-cultivated portions of the segment, drainages can be deep and rugged. For 8.6 miles, nearly half the distance, Route Segment 2c would be parallel and next to the Midway-Moxee 115 kV transmission line and the Union Gap-Midway 230 kV transmission line.

Twelve cultural resources have been previously recorded within one mile of the centerline of Route Segment 2c. These include six prehistoric lithic scatters, a burial site 0.5 mile from the segment, and a site with talus pits 0.3 mile from the segment. Historic resources include two trash scatters and one architectural resource; a stage stop with outbuildings.

Physical Impacts
Short-term and long-term ground disturbance along this route segment would total 88.8 acres. None of the land within 75 feet of the centerline of Route Segment 2c has been previously surveyed for cultural resources and there are no previously recorded cultural resources within 75 feet. Physical impacts are anticipated to be low to moderate because archaeological site densities in nearby areas appear to be low, and also because 35 percent of the segment would pass through cultivated land. There would be no physical impacts to architectural resources.

Visual Impacts
None of the land within 250 feet of the centerline of Route Segment 2c has been previously surveyed for cultural resources and there are no previously recorded cultural resources within this distance. Undiscovered archaeological sites, should they exist, would typically not be visually sensitive, but a prehistoric burial site 0.5 mile to the north and a site with talus pits 0.3 mile to the north could potentially be visually impacted by the presence of a transmission line. One documented architectural resource, a stage stop with outbuildings, may also be visually sensitive, although an existing highway and the existing Midway-Moxee transmission line may have already substantially reduced the integrity of setting for this resource.

Visual impacts are anticipated to be low because of the existing transmission lines, the highway and the relatively large amount of cultivated land.

Native American Concerns
The YNCRP has not identified any sites of special concern along Route Segment 2c (Lally and Camuso 2011). Therefore, impacts to sites of Native American concern are expected to be low.

4.11.4.7 Route Segment 2d (Agency Preferred Alternative)

Route Segment 2d is 7.0 miles long. This segment crosses Yakima Ridge, Cold Creek, and Umtanum Ridge and ends at the Columbia River. Terrain is rugged in places and drainages are deep. There has been limited cultural resource survey within one mile of the centerline. Excluding sites across the river from where this route segment ends, only nine cultural resources have been previously recorded within a mile of the centerline. These are mostly lithic scatters, but include one site 0.25 mile from the centerline that is reported to contain burials. One historic resource, the Hanford Grade of the former Chicago, Milwaukee, St. Paul, & Pacific (C, M, SP, & P)Railroad, is along the river.

Physical Impacts
Short-term and long-term ground disturbance along this route segment would total 41.9 acres. Within 75 feet of the centerline of Route Segment 2d, 3.9 percent of the land has been previously surveyed for cultural resources. Only one cultural resource, the Hanford Grade of the C, M, SP & P Railroad, has been previously recorded. There would be no physical impacts to architectural resources.

If a portion of the transmission line along Route Segment 2d directly disturbs the Hanford Grade, this potentially would be a high physical impact. For most of route segment, the terrain and proximity to the river suggests that there would be a moderate impact.

Visual Impacts
Approximately 3.2 percent of the land within 250 feet of the centerline has been previously surveyed for cultural resources. The only resource identified is the Hanford Grade of the former C, M, SP, & P

Railroad. Because of the grade's condition, it is probably not sensitive to changes in visual setting. Burial sites near Route Segment 2d may be visually sensitive.

Visual impacts are anticipated to be low for most of Route Segment 2d because undiscovered archaeological sites, should they exist, would probably not be visually sensitive. However, visual impacts on cultural resources on burial sites may be high.

Native American Concerns
The YNCRP has identified one resource of special concern in the northern portion of Route Segment 2d (Lally and Camuso 2011). A portion of this route segment would cross through a TCP. Therefore, the potential for impacts to the resource is expected to be high.

4.11.4.8 Route Segment 3a (Agency Preferred Alternative)

Route Segment 3a is a very short segment, only 0.1 mile long, that would connect to the existing Vantage substation. The area surrounding the Vantage substation and near Wanapum Dam has been extensively investigated by archaeologists and there are over 150 previously recorded cultural resources within one mile of Route Segment 3a.

Physical Impacts
Short-term and long-term ground disturbance along this route segment would total 1.2 acres. All of the land within 75 feet of the centerline of Route Segment 3a has been surveyed for cultural resources. Two archaeological resources and one architectural resource, the Vantage substation, have been previously recorded. The substation has been determined eligible to the National Register, but the tie-in of a new transmission line would not have an impact on this existing facility. Of the two archaeological sites, both prehistoric lithic scatters, one has been determined not eligible to the National Register and one is unevaluated.

Therefore, physical impacts of Route Segment 3a would potentially be high only at the unevaluated archaeological site. The remainder of the segment would have low physical impacts.

Visual Impacts
All of the land within 250 feet of the centerline of Route Segment 3a has been surveyed for cultural resources. In addition to the two archaeological resources mentioned above, the Vantage substation, the Midway to Vantage #1 Transmission Line, and the Vantage to Columbia #1 Transmission Line have been recorded as cultural resources in this area. All three of these architectural resources have been determined eligible to the National Register by the Washington DAHP, but none of them would be visually impacted by the presence of a new transmission line. The one unevaluated archaeological site in the vicinity does not have characteristics that would make it sensitive to changes in visual setting.

Therefore, visual impacts of Route Segment 3a on cultural resources would be low.

Native American Concerns
The YNCRP has not identified any resources of special concern along Route Segment 3a (Lally and Camuso 2011). Impacts are expected to be low.

4.11.4.9 Route Segment 3b

Route Segment 3b is 21.7 miles and for most of its distance runs along the abandoned railroad right-of-way (ROW) next to or near the Columbia River. Much of the land within one mile and west of the centerline is on JBLM YTC. The proportion of land surveyed for cultural resources is higher than most other segments, but it is still relatively small. Even without intensive surveys, there have been hundreds of cultural resources identified over the years within one mile of the centerline, especially near the river. These include lithic scatters, village sites, burials, rock shelters, rock features of various sizes and shapes, petroglyphs and pictographs as well as many historic sites. Far fewer cultural resources have been recorded in the higher, more rugged terrain on JBLM YTC within a mile of the centerline, with more than half being lithic scatters.

Physical Impacts
Short-term and long-term ground disturbance along this route segment would total 107.9 acres. In all, 12.3 percent of the land within 75 feet of the centerline of Route Segment 3b has been surveyed by archaeologists, and cultural resources have also been recorded in locations not subject to intensive survey. There are 44 known archaeological resources within 75 feet of the proposed centerline. These include a prehistoric archaeological district; prehistoric lithic scatters, cairns and rock features, pictographs, rockshelters, and talus pits; and historic trash scatters, the Hanford Grade of the C, M, SP, & P Railroad, railroad camps, irrigation features, and the remains of a ranch. Some of the prehistoric sites may also qualify as TCPs, including the archaeological district. There are no architectural resources within 75 feet of Route Segment 3b. There would be no direct physical impacts to architectural resources.

Many of the archaeological sites have been vandalized in the past. Construction of the transmission line along Route Segment 3b would require improvements along the former railroad grade to allow access by construction equipment, because access by land is currently very limited. Selection of Route Segment 3b could lead to increased public access to the area and vandalism of archaeological sites.

Because of the density of archaeological sites, the potential for direct and indirect physical impacts on cultural resources by Route Segment 3b is high.

Visual Impacts
Approximately 13.7 percent of the land within 250 feet of the centerline of Route Segment 3b has been previously surveyed by archaeologists. Eighty archaeological resources, including the 44 resources mentioned above, are within 250 feet of the centerline of Route Segment 3b. There is one architectural resource within the 250 feet of Route Segment 3b, the Midway to Vantage #1 Transmission Line, which would not be visually impacted by the presence of another transmission line. Many of the archaeological sites near the river contain the kinds of features – petroglyphs, burials, talus pits, rock features. These resources can be considered potentially sensitive to changes in visual setting. Sites farther up the hills and farther from the river tend to be smaller and less diverse; nearly half of them are prehistoric lithic scatters with no other features. It is likely that most, but not all, cultural resources farther from the river on JBLM YTC would not be visually sensitive.

Overall, Route Segment 3b would have high visual impacts on some cultural resources.

Native American Concerns
The YNCRP has reported that there are numerous resources of special concern to Native Americans along Route Segment 3b (Lally and Camuso 2011). In addition, there are several major sites of spiritual or historical importance to the Yakama and Wanapum within three miles of this route segment.

In addition, resolutions have been passed by the Yakama Nation Tribal Council Lands Committee (CA# 102 2011-5; and CA# 048 2010-10) expressing opposition to what is now known as Route Segment 3b because of its proximity to sensitive tribal resources.

Impacts to resources of special concern to Native Americans caused by Route Segment 3b would be high.

4.11.4.10 Route Segment 3c (Agency Preferred Alternative)

Route Segment 3c is 25.4 miles long. It would run for a short distance along the south and north sides of the Columbia River and then would turn north to cross cultivated land, usually paralleling existing roads. Farther north it would cross the Wahluke Slope, the Saddle Mountains and lower Crab Creek before approaching the Vantage substation area. Of the total distance, nearly nine miles (35 percent) would cross through cultivated land. For about four miles through the Saddle Mountain area, Route Segment 3c would parallel the existing Midway to Vantage #1 Transmission Line.

The private, cultivated land has not been previously surveyed for cultural resources, but it is likely that few cultural resources exist there. However, in the Saddle Mountain area, the line crosses an area in which hundreds of cultural resources have been recorded within one mile of the centerline of Route Segment 3c. In one square-mile section, a total of 105 cultural resources have been recorded, all but a few being prehistoric. These include 53 isolated stone flakes or tools (which are assumed for this EIS to be not eligible to the National Register) and 37 lithic scatters and sites described as "lithic material" with no other features. These sites are unevaluated and are assumed to be eligible to the National Register. Other prehistoric archaeological sites in or near this section contain pits (2) rock cairns and alignments (10), rockshelters, house pit depressions, and lithic procurement and quarry areas. If similar site densities are found elsewhere in the Saddle Mountains, there could be a density of one potentially eligible cultural resource for every 12 acres of ROW (or approximately one eligible site every 0.7 mile along the transmission line).

Physical Impacts
Short-term and long-term ground disturbance along this route segment would total 121.8 acres. Only 6.4 percent of the land within 75 feet of the Route Segment 3c centerline has been surveyed for cultural resources, and 11 archaeological resources have been recorded. Prehistoric sites consist of lithic scatters, rock cairns, and talus pits. The historic-period Hanford Grade of the C, M, SP, & P Railroad runs along the Columbia River within 75 feet of the centerline. There is one architectural resource within 75 feet of the centerline, the Midway to Vantage #1 Transmission Line. There would be no physical impacts to architectural resources.

Given the extent of cultivated land and the density of cultural resources in the Saddle Mountains described above, physical impacts of Route Segment 3c would be moderate to high.

Visual Impacts
Approximately 6.4 percent of land within 250 feet of the centerline has been surveyed for cultural resources and 29 archaeological resources have been recorded. These include prehistoric lithic scatters, cairns, and talus pits, with most not being visually sensitive. The historic resources include a trash scatter and the Hanford Grade of the C, M, SP, & P Railroad. There is one architectural resource, the Midway to Vantage #1 Transmission Line. None of the historic-period cultural resources are visually sensitive.

Overall, visual impacts of Route Segment 3c on cultural resources would be moderate.

Native American Concerns
The YNCRP has reported that several resources of special concern are located along Route Segment 3c (Lally and Camuso 2011).

Route Segment 3c crosses several TCPs of concern. The portion of the route segment crossing Lower Crab Creek is of particular concern. The YNCRP opposes the portion of Route Segment 3c that crosses Lower Crab Creek.

Therefore, impacts to resources of concern to Native Americans by Route Segment 3c is considered high.

4.11.5 Mitigation Measures

As part of the Section 106 process, a Programmatic Agreement (PA) is being prepared setting forth the procedures for identifying, evaluating, and managing cultural resources along the selected alternative. The parties to the agreement will include BLM, the U.S. Department of the Army (Army), the Washington SHPO, other agencies, and possibly other interested parties. Among other things, this PA will likely include: 1) the process for defining the area of potential effects (APE) for the selected route; 2) procedures for completing cultural resource survey within the APE; 3) procedures for evaluating the National Register and Washington Heritage Register eligibility of identified cultural resources; 4) steps in assessing effects of the proposed Project on eligible cultural resources; 5) appropriate measures for mitigating adverse effects on eligible cultural resources that cannot be avoided; 6) when, how, where, and by whom construction monitoring would be carried out; 7) appropriate responses to the discovery of unanticipated cultural resources or human remains during construction; 8) the contents and schedule for technical reports resulting from surveys, test excavations, data recovery excavations, and other studies; 9) procedures for ensuring timely review by appropriate agencies throughout the process; and 10) a commitment to continue consultation efforts with affected Native American groups. By completing and implementing the PA, the Section 106 process would be complete, although specific activities would still need to be carried out by the BLM and Pacific Power. Procedures for evaluating, assessing effects, and mitigating adverse effects at specific cultural resources will be addressed in a Historic Properties Treatment Plan prepared after the cultural resource survey.

4.11.6 Residual Impacts – All Segments

Physical Impacts
Implementation of the requirements outlined in the PA would ensure mitigation of impacts through avoidance or other measures. Therefore, there would be no residual impacts related to physical impacts.

Visual Impacts
Implementation of the requirements outlined in the PA would ensure efforts are made to identify and, if possible, mitigate visual impacts to cultural resources through redesign or other measures. In many cases, mitigation may reduce but not eliminate visual impacts. Residual impacts could exist at some cultural resources, but the level of impact can be identified only on a case-by-case basis.

Native American Concerns
The BLM will continue the government-to-government consultation process to ensure that concerns by the Yakama, Wanapum, and other interested Native American groups are taken into consideration throughout Project planning and construction. Avoidance is expected to be the preferred mitigation measure. The amount of residual impacts to resources of special concern to Native Americans will be assessed only though the on-going consultation process.

4.11.7 Impact Summary by Alternative

4.11.7.1 No Action

Under the No Action Alternative, construction of a new 230 kV transmission line and changes to the existing Pomona Heights and Vantage substations would not occur. Current, on-going operation and maintenance activities for existing facilities in the Project area would continue.

Under No Action, there would be no ground disturbance associated with the construction of the Vantage to Pomona Heights transmission line, such as clearing vegetation, grading of access roads, improving existing access roads, installing tower foundations, assembling and erecting towers, stringing and tensioning conductors, and restoration and re-vegetation measures. No cultural resources would be adversely affected.

Also, under No Action, there would be no visual impacts to cultural resources resulting from modern structures being introduced into visual settings of cultural resources.

There would also be no change in public accessibility to a previously remote area so there would be no increase potential for vandalism at cultural resources.

Overall, the No Action Alternative would result in no impacts to archaeological and architectural resources and there would be no impacts to sites of Native American concern.

4.11.7.2 Route Alternatives

Physical Impacts
For this EIS, physical impacts to cultural resources are related to the number and types of cultural resources in an area and to the amount and specific location of ground disturbance in the same area. Because short-term or temporary ground disturbance and long-term or permanent ground disturbance both cause permanent damage to, or destruction of, cultural resources, Table 4.11-1 summarizes the combined short-term and long-term ground disturbance for each alternative.

Table 4.11-2 includes cultural resources that have been previously documented within 75 feet of the alternative centerlines. Alternatives B, C, E, and G each have the greatest number of cultural resources (N=49) within the corridor, including 43 archaeological resources, one archaeological district, three isolated finds, and two architectural resources. The fewest cultural resources are found within 75 feet of Alternatives A, D (Agency Preferred Alternative), F, and H, each with 16 resources. Table 4.11-3 summarizes previously documented cultural resources within 250 feet of the alternative centerlines. The greatest number of cultural resources are along Alternatives B (N=86), C (N=87), E (N=86), and G (N=87). Alternative H has the fewest cultural resources within 250 feet of the centerline (N=25).

The high number of cultural resources recorded along Route Segment 3b accounts for the differences among the alternatives. Ground disturbance along Route Segment 3b would be the same regardless of whether Alternative B, C, E, or G were selected.

TABLE 4.11-1 TOTAL GROUND DISTURBANCE (SHORT-TERM AND LONG-TERM) BY ALTERNATIVE

ALTERNATIVE	TOTAL ACRES (ACCESS MODEL A)	TOTAL ACRES (ACCESS MODEL B)
A	336.1	329.1
B	322.2	314.3
C	315.6	315.6
D (Agency Preferred Alternative)	329.5	329.5
E	335.2	313.0
F	349.1	327.9
G	328.6	317.9
H	342.5	332.7

Visual Impacts
Table 4.11-4 summarizes the cultural resources that may be visually sensitive to the presence of a transmission line. For this EIS, it has been assumed that visually sensitive resources include those with

burials, rock features (cairns, alignments), talus pits, rock art (pictographs and petroglyphs), and rockshelters. The greatest number of these types of resources is found along Route Segment 3b. Therefore, Alternatives B, C, E, and G have the most resources that may be potentially visually sensitive (N=31).

Native American Concerns
The YNCRP has identified only one resource of special concern in the vicinity of Route Segment 1a. The YNCRP has identified only six resources of special concern in the vicinity of Route Segments 1b, 1c and 2a (Lally and Camuso 2011). Impacts to resources of special concern to Native Americans are expected to be low.

The YNCRP has not identified any sites of special concern along Route Segments 2b and 2c. One resource of special concern is located along Route Segment 2d (Lally and Camuso 2011). Because of the distance, impacts are expected to be low for Route Segments 2b and 2c. For Route Segment 2d, impact to a resource of special concern is expected to be high.

The YNCRP has reported that there are many resources of special concern to Native Americans along Route Segment 3b. In addition, the Yakama Nation Tribal Council Lands Committee and Cultural Committee have passed resolutions expressing opposition to Route Segment 3b. Impacts to resources of special concern to Native Americans caused by Route Segment 3b would be high.

There are several resources of special concern within three miles of Route Segment 3c. Although TCPs have been identified along Route Segment 3c, the route would have fewer impacts than Route Segment 3b. However, an alternative route across Lower Crab Creek is proposed by YNCRP to avoid impacts to resources of concern. The proposed route segment across Lower Crab Creek is of particular concern to the YNCRP (Lally and Camuso 2011). Overall, alternatives that include Route Segment 3b (Alternatives B, C, E, and G) would have higher impacts to sites of Native American concern than alternatives that include Route Segment 3c (Alternatives A, D, F, and H).

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TABLE 4.11-2 CULTURAL RESOURCES WITHIN 75-FEET OF THE CENTERLINE BY ROUTE SEGMENT AND ALTERNATIVES**

ROUTE SEGMENT	TOTAL CULTURAL RESOURCES	RESOURCE TYPE				NATIONAL REGISTER STATUS[1]		
		DISTRICTS	ARCHAEOLOGICAL SITES	ISOLATED FINDS	ARCHITECTURAL RESOURCE	DETERMINED ELIGIBLE	NOT ELIGIBLE	UNEVALUATED
1a*								
1b*								
1c								
2a*								
2b								
2c*								
2d*	1		1					1
3a*	3		2		1	1	1	1
3b	45	1	40	3	1	3	5	37
3c*	12		9	2	1	1	3	8
ALTERNATIVE								
A	16		12	2	2	2	4	10
B	49	1	43	3	2	4	6	39
C	49	1	43	3	2	4	6	39
D (Agency Preferred Alternative)	16		12	2	2	2	4	10
E	49	1	43	3	2	4	6	39
F	16		12	2	2	2	4	10
G	49	1	43	3	2	4	6	39
H	16		12	2	2	2	4	10

[1]National Register status determined by Washington DAHP
** Excludes cultural resources with only DAHP buffers extending into the corridors
*Route segments that comprise the Agency Preferred Alternative.

TABLE 4.11-3 CULTURAL RESOURCE WITHIN 250-FEET OF CENTERLINES BY ROUTE SEGMENT AND ALTERNATIVE**

ROUTE SEGMENT	TOTAL CULTURAL RESOURCES	RESOURCE TYPE				NATIONAL REGISTER STATUS[1]		
		DISTRICTS	ARCHAEOLOGICAL SITES	ISOLATED FINDS	ARCHITECTURAL RESOURCE	DETERMINED ELIGIBLE	NOT ELIGIBLE	UNEVALUATED
1a*								
1b*								
1c								
2a*								
2b								
2c*	1		1					1
2d*	1		1					1
3a*	3		2		1	1	1	1
3b	82	1	71	9	1	3	10	69
3c*	30		18	11	1	1	12	17
ALTERNATIVE								
A	34		21	11	2	2	13	19
B	86	1	74	9	2	4	11	71
C	87	1	75	9	2	4	11	72
D (Agency Preferred Alternative)	35		22	11	2	2	13	20
E	86	1	74	9	2	4	11	71
F	34		21	11	2	2	13	19
G	87	1	75	9	2	4	11	72
H	25		22	11	2	2	13	20

[1]National Register status determined by Washington DAHP
*Route segments that comprise the Agency Preferred Alternative.
** Excludes cultural resources with only DAHP buffers extending into the corridors

TABLE 4.11-4 VISUALLY SENSITIVE CULTURAL RESOURCES WITHIN 250-FEET OF CENTERLINES BY ROUTE SEGMENT AND ALTERNATIVE**

ROUTE SEGMENT	POSSIBLE VISUALLY SENSITIVE CULTURAL RESOURCES[1]
1a*	
1b*	
1c	
2a*	
2b	
2c*	
2d*	
3a*	
3b	31
3c*	3
ALTERNATIVE	
A	3
B	31
C	31
D (Agency Preferred Alternative)	3
E	31
F	3
G	31
H	3

[1]Includes sites with burials, petroglyphs, pictographs, rockshelters, cairns, talus pits, or rock features.
*Route segments that comprise the Agency Preferred Alternative.
** Excludes cultural resources with only DAHP buffers extending into the corridors

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4.12 WILDLAND FIRE ECOLOGY AND MANAGEMENT

4.12.1 Methods and Impact Types

4.12.1.1 Analysis Methods

The impact analysis for wildland fire ecology and management focused on whether the proposed Project would alter the effectiveness of firefighting, would increase the risk of a wildfire event, and increase ignition potential. Refer to Chapter 2 for a description of the disturbance model and to Section 4.2 (Vegetation and Special Status Plant Species) for a discussion of the impacts specific to vegetation.

4.12.1.2 Impact Types

The general types of impacts caused by the construction, operation, and maintenance of the Project to wildland fire ecology and management include:

- Increased wildland fire ignition through construction activities (e.g., welding, vehicle ignition), the presence of energized transmission lines (e.g., arc ignition), and increased off-highway vehicle (OHV) usage;
- Increased wildland fire ignition potential and rate of spread through the introduction of non-native plants (e.g., cheatgrass);
- Loss of native plant communities and a conversion to annual grasslands; and
- Increased complexity of fire suppression operations.

4.12.2 Impact Levels (High, Moderate, Low, No Identifiable Impact)

Impact levels are assigned based on resource sensitivity, resource quality (i.e., context or the existing condition of the resource), resource quantity (i.e., the amount of the resource potentially affected), and the type and duration of impact (i.e., short- or long-term). These criteria were applied to develop impact level categories of high, moderate, low and no identifiable.

High
Impacts would be classified as high if the proposed Project would result in one or more of the following: disturbance would occur where highly flammable vegetation, such as annual grasses (e.g., cheatgrass), is the dominant vegetation cover type, increasing the risk of wildland fire ignition; and added complexity and increased safety hazard for firefighters due to the presence of multiple transmission lines.

Moderate
Impacts would be classified as moderate if the proposed Project would result in one or more of the following: disturbance would occur in areas with highly flammable vegetation (e.g., annual grasses) is present, but the plant community is dominated by native vegetation (e.g., riparian vegetation, perennial grasses, shrubs); no other transmission lines occur in the area, but the presence of new overhead transmission lines increases the complexity of firefighting but does not pose an increased safety hazard for firefighters.

Low
Impacts would be classified as low if the proposed Project would result in one or more of the following: disturbance would occur in a plant community that is dominated by native vegetation; and the presence of new overhead transmission lines would not affect the effectiveness or safety of firefighting.

No Identifiable
Impacts would be classified as no identifiable if the proposed Project would result in the following: disturbance to vegetation would be completely avoided; and fire fighting suppression effectiveness and safety would not be altered.

4.12.3 Impacts Common to All Route Segments

Impacts from construction, operation and maintenance of the proposed Project could impact wildland fire ecology and management in the Project area; however, potential fire risk is increased by fuel availability (e.g., vegetation), construction activities (e.g., welding, vehicle ignition), the presence of energized transmission lines (e.g., arc ignition) and increased OHV usage.

It is anticipated that some construction activities would occur during summer months when the weather is hot and dry and the potential for wildland fires is high. Heat or sparks from construction vehicles or equipment have the potential to ignite dry vegetation and cause a fire.

New access roads combined with new ground disturbance could lead to an increased potential for the proliferation of non-native species. The risk of wildfire increases in areas with established populations of cheatgrass and other non-native annual species. Increased use of access roads and rights-of-way (ROW) established for the Project could lead to an increase in the number of human-caused ignitions in the Project area. Increased fire danger can result from activities by unauthorized users on or near the Project corridor from a variety of means including campfires, un-extinguished cigarettes, and vehicle exhaust systems coming into contact with dry vegetation.

The addition of linear features and developments in the Project area would further fragment the landscape and could increase the complexity of fire suppression operations. However, access roads could also be used as fire breaks and access for fire fighting vehicles. To reduce the potential for wildland fire to be ignited by human-use of the new access roads, new or improved access (e.g., blading, widening existing access) roads not required for maintenance would be closed or rehabilitated following construction. Closing access roads would protect the resources in that area from further disturbance from the spread of noxious weeds or fire by limiting new or improved accessibility by OHVs and other motorized vehicles.

When wildland fires are ignited in the vicinity of distribution or transmission power lines, potential conflicts and risks occur to wildfire suppression tactics. Power line hazards, such as electrical shock and/or reduced aerial and ground tactics, have potential impacts to wildfire suppression efforts and firefighter safety. Aerial and ground attacks can be restricted when power lines are present. Aerial operations can be complicated by the risk of aircraft and/or water buckets colliding with towers and/or conductors during smoky, reduced-visibility conditions. Wildland firefighters working around energized power lines are exposed to electrical shock hazards including direct contact with downed power lines, contact with electrically charged materials and equipment due to broken lines, contact with smoke that can conduct electricity between lines and the use of solid-stream water applications around energized lines (NIOSH 2002). To minimize the potential impacts the proposed Project could have on fire suppression operations (e.g., increased complexity and safety hazards), discussions will be initiated with local fire districts and regional fire prevention staff prior to construction to provide transmission line safety training, including safety procedures when conducting fire suppression near a power line. As transmission lines are currently present in the Project area, the obstruction to firefighting suppression activities already exists and the new line will not create an additional obstruction.

It would be unlikely the Project facilities would cause fires except in the rare case of arcing from the power line to the ground or nearby vegetation. In the event of a lightning strike, ground wires on the structures ground the current. Wildland fires have the potential to affect the operation of the Project facilities, and consequently, the reliability of the transmission system in the region. Smoke and hot gases from a large fire under or near a power line can create a conducting path between conductors and the ground, initiating flashovers. Fires can also damage steel support structures and overhead conductors, and can destroy wood pole support structures.

To minimize the potential for wildland fire, all applicable fire laws and regulations would be observed during the construction period and construction personnel would be advised of their responsibilities under the applicable fire laws and regulations, including taking practical measures to report and suppress fires. A Fire Protection and Control Plan will be developed and incorporated into the Plan of Development (POD). This Plan will include practices such as operating all internal and external combustion engines (e.g., OHV, chainsaws, generators, heavy equipment) with qualified spark arresters, fueling all highway-authorized vehicles off-site to minimize the risk of fire, and carrying fire suppression equipment on all vehicles and equipment.

A Noxious Weed Control Plan will be developed and included in the POD. Areas dominated by native and non-native vegetation that are disturbed during construction activities will be revegetated following construction. Revegetating disturbed areas and implementing noxious weed control practices will reduce the potential for the spread of noxious weeds and changes in plant community composition and structure. In addition, the blading of native plant communities will be minimized during construction. Minimizing disturbance to native plant communities would reduce the potential for the loss of native vegetation and the spread of noxious weeds. These practices are expected to minimize the potential for changes to plant community composition that could lead to increased fire risk.

Although trees are generally scarce within the Project area, to prevent fires and other hazards a safe clearance will be maintained between the tops of trees and power lines. In most cases, trees will not be allowed to grow over 20 feet high in the ROW. Trees that could fall into the line (e.g., danger or hazard trees) will also be cleared from the ROW.

4.12.4 Impacts Specific to Route Segments

Long-term impacts to wildland fire ecology and management were assessed for each route segment and are discussed in detail in the following sections. Impacts specific to vegetation cover types are discussed in detail in Vegetation and Special Status Plants (Section 4.2) and are not discussed in this section.

4.12.4.1 Route Segment 1a (Agency Preferred Alternative)

Construction of Route Segment 1a would occur in annual grasslands for approximately 1.1 miles. No recent fires have been documented along Route Segment 1a. Impacts from the construction of this route segment would be similar to those described above for all route segments (Section 4.12.3). As discussed above, wildland fire risk would be reduced along this route segment by developing and implementing a Fire Protection and Control Plan and a Noxious Weed Control Plan, revegetating disturbed areas following construction, removing hazard trees, and closing access roads that are no longer needed.

Route Segment 1a is not anticipated to have any impacts on fire suppression operations. Existing roads are paralleled for the majority of this route segment. In addition, discussions will be initiated with local fire districts and regional fire prevention staff prior to construction to provide transmission line safety training, including safety procedures when conducting fire suppression near a power line. Impacts to wildland fire ecology and management from the construction of Route Segment 1a would include 0.6 mile of no identifiable, 0.5 mile of low and 1.1 miles of moderate levels of wildfire risk based on surrounding vegetative fuels that could be ignited during construction activities.

4.12.4.2 Route Segment 1b (Agency Preferred Alternative)

Construction of Route Segment 1b would occur in annual grasslands for approximately 1.8 miles. The majority of this route segment parallels an existing Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) fire break road. Several small fires have occurred within and near this route segment, primarily on the JBLM YTC. Impacts from the construction of this route segment would be similar to those described above for all route segments (Section 4.12.3) and for Route Segment 1a.

Route Segment 1b is not anticipated to have any impacts on fire suppression operations. This route segment has experienced fire activity in the past and could be more susceptible to fire damage due to the type and intensity of training that occurs at the JBLM YTC; however, the incidence of fire ignition and spread at the JBLM YTC has been declining since 1996 due to improvements to their fire management policy and increased support. Improvements include annual Prescribed Burn Plans, implementation of the Fire Risk Assessment, pyrotechnic restrictions during periods of high fire danger, wildland fire fighting training, and remote sensing and fire history monitoring (JBLM YTC Fire Management Policy 2004). In addition, the JBLM YTC annually maintains over 240 miles of firebreaks to serve as a barrier to limit the potential spread of wildland fires and provide access for fire suppression crews (JBLM YTC 2002). BPA's Ellensberg-Moxee #1 115 kilovolt (kV) line intersects near the start of this route segment, but is not anticipated to add complexity to fire fighting efforts. Impacts to wildland fire ecology and management from the construction of Route Segment 1b would include 1.1 miles of no identifiable, 9.6 miles of low and 1.8 miles of moderate levels of wildfire risk based on surrounding vegetative fuels that could be ignited during construction activities.

4.12.4.3 Route Segment 1c

Route Segment 1c parallels Route Segment 1b for the majority of the route segment. Construction of Route Segment 1c would occur in annual grasslands for approximately 7.3 miles. Fire history is the same as Route Segment 1b. Impacts from the construction of this route segment would be similar to those described above for all route segments (Section 4.12.3) and for Route Segment 1b. Impacts to wildland fire ecology and management from the construction of Route Segment 1c would include 1.2 miles of no identifiable, 4.5 miles of low and 7.3 miles of moderate levels of wildfire risk based on surrounding vegetative fuels that could be ignited during construction activities.

4.12.4.4 Route Segment 2a (Agency Preferred Alternative)

Construction of Route Segment 2a would occur in annual grasslands for approximately 0.9 mile. Fire history records indicate that no recent fires have occurred along Route 2a. Impacts from the construction of this short route segment would be similar to those described above for all route segments (Section 4.12.3) and for Route Segment 1a. Impacts to wildland fire ecology and management from the construction of Route Segment 2a would include 0.1 mile of low and 0.9 mile of moderate levels of wildfire risk based on surrounding vegetative fuels that could be ignited during construction activities.

4.12.4.5 Route Segment 2b

Construction of Route Segment 2b would occur in annual grasslands for approximately 3.2 miles. Several large fires have occurred near Route Segment 2b, including the Dry Creek Complex that burned over 48,000 acres in 2009. This route segment would parallel JBLM YTC's fire break for approximately 8 miles. Impacts from the construction of this route segment would be similar to those described above for all route segments (Section 4.12.3) and for Route Segment 1b. Impacts to wildland fire ecology and management from the construction of Route Segment 2b would include 1.1 miles of no identifiable, 12.1 miles of low, and 3.2 miles of moderate levels of wildfire risk based on surrounding vegetative fuels that could be ignited during construction activities.

4.12.4.6 Route Segment 2c (Agency Preferred Alternative)

Construction of Route Segment 2c would occur in annual grasslands for approximately 5.9 miles. A substantial section (7.6 miles) of disturbance would occur to agricultural land and developed areas. Two fires have occurred near Route Segment 2c. Route Segment 2c will be within an existing power line corridor that accommodates the Union Gap-Midway 230 kV and Midway-Moxee 115 kV lines for approximately nine miles. The addition of Route Segment 2c into this existing transmission line corridor is not anticipated to increase the complexity of fire suppression activities. Fire suppression efforts may be reduced for approximately eight miles where Route Segment 2c parallels the Midway-Moxee 115 kV line at a distance of one mile to where it intersects the existing power line corridor. These lines would form transmission bounded islands. Transmission bounded islands are identified when two or more transmission lines create an enclosed area surrounded by transmission lines. These bounded islands could reduce the effectiveness of fire suppression efforts and create an area that poses a threat to firefighter safety; however, transmission bounded islands already exist and the new line would not create an additional obstruction. Discussions with local fire districts and regional fire prevention staff prior to construction to provide transmission line safety training, including safety procedures when conducting fire suppression near a power line, are anticipated to reduce impacts to wildland firefighting efforts and danger to firefighters.

Impacts from the construction of this route segment would be similar to those described above for all route segments (Section 4.12.3) and for Route Segment 1a. Impacts to wildland fire ecology and management from the construction of Route Segment 2c would include 7.5 miles of no identifiable, 1.4 miles of low, and 9.2 miles of moderate levels of wildfire risk based on surrounding vegetative fuels that could be ignited during construction activities and potential fire fighting barriers created by the presence of other power lines.

4.12.4.7 Route Segment 2d (Agency Preferred Alternative)

Construction of Route Segment 2d would occur in annual grasslands for approximately 0.7 mile. The entire segment of Route Segment 2d occurs within the fire perimeter of the Dry Creek Complex fire. Impacts from the construction of this route segment would be similar to those described above for all route segments (Section 4.12.3) and for Route Segment 1a. Impacts to wildland fire ecology and management from the construction of Route Segment 2d would include 6.3 miles of low and 0.7 mile of moderate levels of wildfire risk based on surrounding vegetative fuels that could be ignited during construction activities.

4.12.4.8 Route Segment 3a (Agency Preferred Alternative)

Route Segment 3a is a short segment with no history of recent fires. Construction of Route Segment 3a would not occur in locations dominated by annual grasslands. Impacts from the construction of this route segment would be similar to those described above for all route segments (Section 4.12.3) and for Route Segment 1a. Impacts to wildland fire ecology and management from the construction of Route Segment 3a would include 0.1 mile of low level of wildfire risk based on surrounding vegetative fuels that could be ignited during construction activities.

4.12.4.9 Route Segment 3b

A short section (0.5 mile) of annual grasslands would be disturbed through the construction of Route Segment 3b. This route segment occurs at the eastern edge of the JBLM YTC along Priest Rapids Lake. Fires have occurred within and near this route segment, burning in the late 1990s, 2004, and the 2009 Dry Creek Complex fire. Impacts from the construction of this route segment would be similar to those described above for all route segments (Section 4.12.3) and for Route Segment 1a. Impacts to wildland fire ecology and management from the construction of Route Segment 3b would include 12.5 miles of no identifiable, 8.7 miles of low, and 0.5 mile of moderate levels of wildfire risk based on surrounding vegetative fuels that could be ignited during construction activities.

4.12.4.10 Route Segment 3c (Agency Preferred Alternative)

Construction of Route Segment 3c would occur in annual grasslands for approximately three miles. A substantial section (15.2 miles) of disturbance would occur to agricultural land and developed areas. The Incident #243 fire burned a portion of this route segment. Route Segment 3c will be within an existing power line corridor that accommodates the Hanford-Vantage #1 500 kV line for approximately seven miles. The addition of Route Segment 3c into this existing transmission line corridor is not anticipated to increase the complexity of fire suppression activities. Eight existing transmission lines occur in the vicinity of Route Segment 3c for approximately 14 miles. These lines would form transmission bounded islands. Transmission bounded islands are identified when two or more transmission lines create an enclosed area surrounded by transmission lines. These bounded islands could reduce the effectiveness of fire suppression efforts and create an area that poses a threat to firefighter safety; however, transmission bounded islands already exist and the new line would not create an additional obstruction. Discussions with local fire districts and regional fire prevention staff prior to construction to provide transmission line safety training, including safety procedures when conducting fire suppression near a power line, are anticipated to reduce impacts to wildland firefighting efforts and danger to firefighters.

Impacts from the construction of this route segment would be similar to those described above for all route segments (Section 4.12.3) and for Route Segment 2c. Impacts to wildland fire ecology and management from the construction of Route Segment 3c would include 9.2 miles of no identifiable, 8.4 miles of low, and 7.7 miles of moderate levels of wildfire risk based surrounding vegetative fuels that could be ignited during construction activities and potential fire fighting barriers created by the presence of other power lines.

4.12.5 Mitigation Measures

Project design features described in Chapter 2 are designed to reduce effects from the proposed Project; therefore, no additional mitigation would be required.

4.12.6 Impact Summary By Alternative

4.12.6.1 No Action

Under the No Action Alternative, the proposed Project would not be constructed or operated. No Project-related impacts to wildland fire ecology and management would occur; however, wildland fire ecology and management would continue to be affected by current use and conditions in the area.

4.12.6.2 Route Alternatives

Table 4.12-1 presents a summary of the level of impacts to wildland fire ecology and management with the implementation of project design features for each end-to-end alternative. Long-term disturbance to vegetation (by vegetation cover type) is presented in Table 4.2-3 (Section 4.2, Vegetation and Special Status Plant Species) and not repeated here.

Alternative B has the highest number of miles with low impacts (37.5 miles) and the lowest number of miles with moderate impacts (8.2 miles). Alternative H has the highest number of miles with moderate impacts (26.9 miles) and the lowest number of miles of low impacts (21.3). This is attributed to locations with higher fire fighting complexity due to the presence of multiple transmission lines. High impact levels are not anticipated for any of the end-to-end alternatives.

TABLE 4.12-1 IMPACT SUMMARY OF END-TO-END ALTERNATIVES FOR WILDLAND FIRE ECOLOGY AND MANAGEMENT

END-TO-END ALTERNATIVES	IMPACT LEVELS[1]			
	HIGH	MODERATE	LOW	NO IDENTIFIABLE
Alternative A 1a, 1b, 2a, 2b, 2d, 3a, 3c 64.5 miles	0	15.4	37.1	12.0
Alternative B 1a, 1b, 2a, 2b, 2d, 3a, 3b 61.0 miles	0	8.2	37.5	15.3
Alternative C 1a, 1b, 2a, 2c, 2d, 3a, 3b 62.8 miles	0	14.2	26.9	21.7
Alternative D **(Agency Preferred Alternative)** 1a, 1b, 2a, 2c, 2d, 3a, 3c 66.3 miles	0	21.4	26.5	18.4
Alternative E 1a, 1c, 2a, 2b, 2d, 3a, 3b 61.4 miles	0	13.7	32.3	15.4
Alternative F 1a, 1c, 2a, 2b, 2d, 3a, 3c 64.9 miles	0	20.9	31.9	12.1
Alternative G 1a, 1c, 2a, 2c, 2d, 3a, 3b 63.2 miles	0	19.7	21.6	21.9
Alternative H 1a, 1c, 2a, 2c, 2d, 3a, 3c 66.7 miles	0	26.9	21.3	18.5

Notes: [1]Impact levels in linear miles. Areas with no identifiable impacts include water, developed, agriculture, and rock. Project design features described in Chapter 2 are designed to reduce effects from the proposed Project; therefore, no additional mitigation would be required.

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4.13 CLIMATE AND AIR QUALITY

4.13.1 Methods and Impact Types

This section describes the potential impacts to local and regional air quality from construction, operation and maintenance of the proposed Project and summarizes the state of knowledge and science regarding global climate change.

4.13.1.1 Analysis Methods

The assessment of potential impacts to air quality considered the following factors:

- Type of construction activity;
- Potential sources and types of emissions;
- Location and duration of construction activity;
- Presence of sensitive receptors in the Project area;
- Regional air quality attainment status; and
- Project design features to reduce or minimize impacts to air quality.

4.13.1.2 Impact Types

The primary types of air pollution during construction would be:

- Combustion pollutants from equipment and vehicle exhaust;
- Fugitive dust particles from disturbed soil associated with auguring holes or foundations for structure installation;
- Fugitive dust from grading and earth moving associated with access road construction; and
- Fugitive dust from construction vehicles traveling on unpaved roads becoming airborne.

4.13.2 Impact Levels

Potential impacts to air quality were assessed considering the following impact levels.

High
Impacts would be considered high where the Project would:

- Cause a cumulatively considerable net increase of any criteria pollutant for which an area is in non-attainment under an applicable federal or state ambient air quality standard.

Moderate
Impacts would be considered moderate where the Project would:

- Expose sensitive receptors (residences, schools, hospitals) to prolonged air pollution from construction activities.
- Impact local and regional air quality that could only be partially reduced or minimized by the implementation of project design features for air quality.

Low
Impacts would be considered low where the Project would:

- Result in a short-term reduction in air quality confined to a construction site or area of ground disturbance; and/or

- Impact to local air quality that could be effectively reduced, minimized or eliminated by the implementation of project design features for air quality.

4.13.3 Impacts Common to All Route Segments

Air quality impacts from construction activities would be similar for all route segments. Impacts on air quality would be short-term and low during construction and localized to the general area of activity. During construction, sources of air emissions would be particulate matter emissions (e.g., fugitive dust) from construction operations, and tailpipe emissions from vehicles and gasoline- or diesel-powered construction equipment. Emissions would be transient as construction progresses and would not occur in one area for a long duration. Most of the proposed Project would be constructed in rural areas with few residences located near the alternative route segments (see Section 4.4 Land Use). The primary emission sources associated with the operational and maintenance phase of the Project include fugitive dust from vehicles using unpaved access roads, and vehicle emissions during periodic maintenance or emergency repair activity. Quantities of emissions would be very small, temporary and localized. Air quality impacts during operation and maintenance of the proposed Project would be none to low.

Particulate matter emissions associated with construction of the transmission line would result predominately from fugitive dust. Construction activities that could create fugitive dust include road building and grading, on-site travel on unpaved surfaces, work area clearing and preparation, and soil disrupting operations. Air quality impacts are expected to be localized, temporary and controlled as practicable. Wind erosion of disturbed areas would also contribute to fugitive dust.

Heavy equipment and vehicles, including those with diesel and internal combustion engines, would emit pollutants such as carbon monoxide, carbon dioxide, sulfur oxides, particulate matter <2.5 microns (PM-2.5), oxides of nitrogen, volatile organic hydrocarbons, aldehydes, and polycyclic aromatic hydrocarbons. The amount of pollutants emitted from construction vehicles and equipment would be relatively small and comparable to current conditions with the operation of agricultural equipment in the vicinity. The Project would not be considered a major source of pollution, and as such, would not be required to obtain a Prevention of Significant Deterioration permit from the Washington Department of Ecology.

Project design features (as described in Section 2.5) would limit emissions during both construction and operation. Prior to construction, a Dust Control Plan would be developed as part of the Plan of Development (POD). The Dust Control Plan would identify dust control measures to be implemented during construction. In addition, fugitive dust emissions would be reduced by the following design features: limiting ground disturbing activities during construction; rehabilitating new or improved access roads, where practicable; utilizing water trucks to control dust during construction; and covering construction materials that are a source of blowing dust (e.g., dirt piles and open pits). Proper equipment maintenance and the use of equipment that meets current U.S. Environmental Protection Agency (EPA) emission standards would reduce tailpipe emissions and associated impacts on air quality.

Impacts on air quality would be short-term during Project construction and dispersion of pollutants would be localized to the vicinity of construction activity and would quickly disperse or settle. Impacts on air quality would not be anticipated to result in the exceedence of the National Ambient Air Quality Standards (NAAQS). The Project area is not located in an EPA designated non-attainment area for any criteria pollutant (see Section 3.13). Impacts to air quality are expected to be short-term and low.

High voltage transmission lines themselves can cause limited air emissions. The high electric field strength of transmission lines causes a breakdown of air at the surface of conductors called corona. The corona effect is most pronounced in humid or wet weather, less so in dry or arid conditions. Corona has a popping sound that is most easily heard during rain storms. When corona occurs, the air surrounding the conductors is ionized and chemical reactions take place which generate small amounts of ozone and nitrogen oxides which are generally too small to be measured. The ozone concentration would be similar to background levels and fluctuations. Since the Project area has an arid climate, which minimizes corona, ozone generation would likewise be minimized. See section 4.16.3 for more information on corona.

4.13.4 Mitigation Measures

Project design features described in Chapter 2 are designed to reduce effects from the proposed Project; therefore, no additional mitigation would be required.

4.13.5 Impact Summary by Alternative

4.13.5.1 No Action

Under the No Action Alternative, the proposed Project would not be constructed and there would be no impact to air quality.

4.13.5.2 Route Alternatives

Implementation of any of the end-to-end alternatives would have similar emissions and impacts on air quality. The same construction equipment would be used and construction would occur over the same time frame. Potential differences could occur in the amount of fugitive dust generated from earth-moving operations because the alternatives would have varying amounts of surface disturbance due to differences in terrain; however, the differences between the alternatives would be negligible. Impacts to air quality are expected to be short-term and low.

4.13.6 Global Climate Change

The assessment of climate changing pollutant emissions and climate change is in its formative phase, therefore, it is not yet possible to know with confidence the net impact to climate. However the Intergovernmental Panel on Climate Change (IPPC 2007) concluded that “warming of the climate system is unequivocal” and “most of the observed increase in globally average temperatures since the mid-twentieth century is very likely due to the observed increase in anthropogenic (man-made) green house gas concentrations.”

The lack of scientific tools designed to predict climate change on regional or local scales limits the ability to quantify potential future impacts. The Bureau of Land Management’s (BLM) Instruction Memorandum (IM) OR-2010-012 states that when information is not available, the analysis should state this and further analysis should not be attempted (BLM 2010). Therefore, climate change analyses for the purpose of this Environmental Impact Statement (EIS) are limited to the accounting and disclosing of factors that contribute to greenhouse gas emissions. As stated in the Council on Environmental Quality (CEQ) *Draft National Environmental Policy Act (NEPA) Guidance on Consideration of the Effects of Climate Change and Green House Gas Emissions,*” [i]n accordance with NEPA’s rule of reason and standards of obtaining information regarding reasonably foreseeable significant adverse effects on the human environment, action agencies need not undertake exorbitant research or analysis of projected climate change impacts in the Project area or on the Project itself, but may instead summarize and incorporate by reference the relevant scientific literature. See, e.g., 40 Code of Federal Regulations (C.F.R.) 1502.21, 1502.22” (CEQ 2010).

Potential impacts related to greenhouses gases would generally be the same for all eight end-to-end route alternatives. Implementation of any of the action alternatives would contribute to greenhouse gas concentrations in several ways. Carbon dioxide, methane, and nitrogen dioxide (N_2O) emission levels would incrementally increase as vegetation and soils are removed and/or disturbed during construction of the transmission line (Kessavalou et al. 1998). Carbon that would be stored in removed vegetation would be offset in time by the growth and accumulation of carbon in soils and new vegetation. Soil disturbance would occur throughout the Project area, as holes are excavated for structure installation and access and spur roads are constructed. Although, recognized as a contribution to overall greenhouse gas emissions, measurement of emissions from soil disturbance is difficult. However, research has shown that emissions as a result of soil disturbance are short-lived and return to background levels after several hours (Kessavaluo et al. 1998). Emissions from construction related vehicles also would impact atmospheric greenhouse gas concentrations incrementally because construction equipment and vehicles would be fueled by gasoline and diesel combustion engines.

Impacts to climate change associated with implementation of the proposed Project cannot be determined because established mechanisms to accurately predict the effect of resource management-level decisions from this project-specific effort on global climate change do not exist. It should be noted that because the proposed Project would result in minimal long-term emissions of greenhouse gases, the long term impacts would not be considered adverse.

4.14 WATER RESOURCES

4.14.1 Methods and Impact Types

4.14.1.1 Analysis Methods

The impact analyses for water resources involved calculating the number of miles traversed by the transmission line route segments per water resource type. Once the mileage was obtained, the rates of disturbance from the disturbance model were applied to these distances to generate estimates of the number of acres of impact per mile of transmission line by water resource type. Refer to Chapter 2 for a description of the disturbance model. Several assumptions were made in this analysis. First, the transmission line itself would free-span all streams and no structures would be placed in active channels. This means that direct impacts to water resources could occur only through road crossings. The following assumptions were made in relation to roadways:

- New access roads, improving existing dirt roads and overland travel may require modification of the stream channels to allow crossing by heavy equipment. Modification could include installation of temporary culverts, bank modification, or temporary bridges.
- Existing roads were not quantified and are assumed to include minor improvements. Existing culverts and bridges may need to be replaced or improved to accommodate construction traffic.

4.14.1.2 Impact Criteria

Sensitivity classifications were assigned to water resources that occur within the Project area. These sensitivity classifications served as the basis for the assigning of impact levels. Criteria used to assign resource sensitivity included state and federal designation (e.g., flood plain, impaired water body) and water resource type (e.g., wetland, stream, river). Table 4.14-1 summarizes the resource sensitivity classification for water resources that occur in the Project area.

TABLE 4.14-1 WATER RESOURCE SENSITIVITY CLASSIFICATION

WATER RESOURCE	SENSITIVITY
303(d) Impaired Surface Water	High
Wetland	High
Perennial Stream	Moderate
River	Moderate
100-Year Floodplain	Moderate
Canal/ditch	Low
Intermittent Stream	Low

4.14.1.3 Impact Types

Impacts to water resources from the implementation of the proposed Project could result from placement of transmission line structures, construction of access roads, and temporary work sites. The Project would not alter the flow in any streams or rivers. The transmission line would free-span all streams and rivers and no structures would be placed in active channels. Construction could require the removal of riparian vegetation and/or the placement of temporary fill. Other impacts could include accidental spills of environmentally harmful materials, increased sedimentation, and contamination of water resources from construction-related disturbance, fugitive dust deposition, increased soil erosion from vegetation removal, or the introduction of noxious weeds and invasive species.

4.14.2 Impact Levels (High, Moderate, Low, No Identifiable Impact)

Impact levels are based on water resources that occur along the assumed transmission line centerline of the alternative route segments (route number and milepost). Impact levels are assigned based on resource sensitivity, resource quality (i.e., context or the existing condition of the resource), resource quantity (i.e., the amount of the resource potentially affected), and the type and duration of impact (i.e., short- or long-term). These criteria were applied to develop impact level categories of high, moderate, low and no identifiable.

High
Impacts would be classified as high if the proposed Project would result in one or more of the following:

- A wetland would be destroyed by permanently filling all or most of it or by altering wetland hydrology;
- Wetland vegetation cover type(s) would be affected on a long-term basis through altering soils or hydrology, such as converting a wetland to an open-water area;
- All or most of the native wetland vegetation would be replaced with weedy, non-native species;
- The connectivity of a wetland to other wetlands, surface waterways, or sub-surface water features would be destroyed;
- The amount of flood storage in a floodplain would be substantially decreased, or the course of flood waters would be greatly altered;
- Water quality for surface waters designated as impaired under the Clean Water Act (CWA) Section 303(d) would be degraded such that major reclamation, special designs, or special maintenance practices would be required; and/or
- Access road construction would substantially alter drainage patterns and increase sedimentation and flooding on a long-term basis.

Moderate
Impacts would be classified as moderate if the proposed Project would result in one or more of the following:

- A portion of a wetland would be filled such that the majority of the wetland would still able to function as a wetland;
- A rare or unique wetland type would be degraded;
- A native wetland plant community would be degraded through the introduction of weedy, non-native species;
- Hydrology would be altered such that a wetland would decrease in size, or the vegetation cover type would be partially altered;
- The connectivity of a wetland to other waters would be diminished;
- The amount of flood storage in a floodplain would be moderately decreased;
- Water quality for surface waters designated as impaired under the CWA Section 303(d) is degraded below state or federal standards, but can be partially mitigated to lessen impacts;
- Construction and clearing takes place near a water resource on erodible soils that have moderate revegetation potential; and/or
- New access road construction would result in moderate amounts of sedimentation to nearby surface-water resources on a long-term basis.

Low
Impacts would be classified as low if the proposed Project would result in one or more of the following:

- A wetland would be temporarily filled or wetland hydrology, soils, or vegetation would be altered. This would be followed by restoring the area to its former condition or enhancing the area;
- The amount of flood storage in a floodplain would slightly decrease;

- Water quality for surface waters designated as impaired under the CWA Section 303(d) could be easily mitigated to state or federal standards with common project design features; and/or
- Access road construction, improvements or overland access would result in temporary increases in sedimentation to nearby surface water resources.

No Identifiable
Impacts would be classified as no identifiable if the proposed Project would result in the following:

- Direct impacts to wetlands would be avoided.
- Wetland hydrology, vegetation, or soils would not be affected by nearby activities.
- The functions of a wetland area would not be affected.
- Direct impacts to CWA Section 303(d) impaired surface waters would be avoided.
- Direct impacts to floodplains would be avoided.
- No access roads would be constructed near water resources.

4.14.3 Impacts Common to All Route Segments

Direct impacts to water resources would be caused by access road construction and improvements, ROW clearing, and site preparation for structures and other facilities such as pulling and tensioning sites, and potentially maintenance activities.

Transmission structures would not be located in intermittent or perennial streams or wetland areas. Depending upon final design, some access road improvements or new access roads may impact intermittent and perennial water courses; however, existing paved and unpaved roads and trails would be used where possible. Erosion control measures and project design features would be implemented, such as installing culverts where needed. Many of the roads would be temporary and culverts would be removed following completion of construction.

Transmission line structures may be placed within the Columbia River's associated 100-year floodplain in several locations. Placement of structures within the floodplain and constructing access roads to these structures is not expected to affect the function and flood storage of the floodplain, or impede or redirect flood flows.

Riparian areas can be particularly vulnerable to disturbance. The removal of vegetation along waterways can cause an increase in water temperature, an increase water velocity, and decreased wildlife habitat. Disturbance of soil in or near riparian areas may lead to erosion of the streambank and increase the deposition of sediment into waterways. In addition, removal of protective vegetation could also expose soil to potential wind and water erosion. This can result in further loss of soil and vegetation, as well as an increase in sediment input to water resources. Impacts to Vegetation and Special Status Plants are described in Section 4.2, impacts to soil and geology are discussed in Section 4.15 Soils and Geology, and Section 4.3 Wildlife and Special Status Wildlife Species discusses impacts to wildlife. Impacts to water resources through vegetation removal would be minimized by implementing specific erosion and sediment control measures to be specified in a Stormwater Pollution Prevention Plan (SWPPP), reseeding following construction and implementing a Noxious Weed Control Plan.

Wetlands within the Project area are not extensive and would be spanned by structures placed in upland areas. No impacts to wetlands are anticipated to occur.

Some construction activities would occur in steeply sloped terrain, which would increase soil exposure and potential impacts to water resources on a short-term basis. Construction in steep areas could impact intermittent streams through vegetation removal, localized increases in erosion, runoff and sedimentation. Where possible, crossing of water resources would utilize existing road crossings. Where new access roads are required, vegetation removal would occur; the soil surface would be disturbed; and erosion, runoff, and sedimentation would increase in nearby watercourses. Erosion would be minimized by applying and maintaining standard erosion and sediment control methods (specified in the SWPPP). Culverts of adequate size would be installed where needed and disturbed areas would be reseeded. In addition, all construction and maintenance activities would be conducted in a manner that would minimize disturbance to vegetation, drainage channels and stream banks.

Short-term impacts could also result from spills of fuel, oils, hydraulic fluid, or other substances. For example, pollutants could be introduced from equipment use or during fueling. Contamination of water resources through spills would be minimized by not refueling and maintaining equipment within a 100-foot radius of a waterbody, a 200-foot radius of all identified private water wells, and a 400-foot radius of all identified municipal or community water supply wells, providing spill prevention kits and other practices described in the Hazardous Spill Prevention Plan, included as part of the Plan of Development. In addition for route segments on the Joint Base Lewis-McChord Yakima Training Center (JBLM YTC), refueling would not occur within 656-feet of any drainage, wet or dry, and parking or staging of vehicles would be at least 328-feet from drainages.

4.14.4 Impacts Specific to Route Segments

Long-term impacts to water resources were assessed for each route segment and are presented in Table 4.14-2. Impacts for each route segment are discussed in detail in the following sections. Impacts to vegetation, wildlife, agricultural land, and soils are discussed in detail in Vegetation and Special Status Plants (Section 4.2), Wildlife and Special Status Wildlife Species (Section 4.3), Land Jurisdiction and Land Use (Section 4.4), and Soil and Geology (Section 4.15), and are not discussed in this section.

4.14.4.1 Route Segment 1a (Agency Preferred Alternative)

No water resources would be disturbed through the construction of Route Segment 1a. Existing roads would be used (Table 4.14-2). No short-term disturbance would occur to water resources. Impacts to water resources from the construction of Route Segment 1a would include 2.2 miles of no identifiable impacts.

4.14.4.2 Route Segment 1b (Agency Preferred Alternative)

No long-term disturbance to water resources would occur with the construction of Route Segment 1b (Table 4.14-2). Short-term disturbance would occur to approximately 5.4 acres of water resources, including Kittitas Canyon Creek, Washout Gulch, six unnamed intermittent streams and three unnamed perennial streams. Access would largely utilize the JBLM YTC's existing fire break; however, improving this fire break for construction may require blading and the temporary installation of culverts, where needed. The flow in these streams would not be altered. The transmission line would free-span all streams and no structures would be placed in active channels. Impacts for Route Segment 1b would be similar to those described above for all route segments (Section 4.14.3). Disturbance along this route segment would be minimized by the use of existing roads to access structure sites, where practicable, by implementing erosion and sediment control, reseeding following construction and conducting noxious weed control activities. Impacts to water resources from the construction of Route Segment 1b would include 11.4 miles of no identifiable impacts and 1.1 miles of low impacts.

4.14.4.3 Route Segment 1c

No long-term disturbance to water resources would occur with the construction of Route Segment 1c (Table 4.14-2). With Route Segment 1c, short-term disturbance would occur to approximately 7.7 acres of water resources. Route Segment 1c parallels Route Segment 1b, but would result in more short-term ground disturbance to water resources, approximately 2.3 additional acres. The additional short-term ground disturbance is due to: crossing an additional unnamed intermittent stream; crossing an additional unnamed perennial stream; and additional road construction in sloping and steep terrain where intermittent streams are present. With Route Segment 1c, short-term disturbance would occur at Kittitas Canyon Creek, Washout Gulch and seven unnamed intermittent stream crossings, including Kittitas Canyon Creek and Washout Gulch, and four unnamed perennial streams. The flow in these streams would not be altered. The transmission line would free-span all streams and no structures would be placed in active channels. Impacts for Route Segment 1c would be similar to those described above for all route segments (Section 4.14.3). Disturbance along this route segment would be minimized by using existing roads to access structure sites, where practicable, by implementing erosion and sediment control, installing culverts of adequate size where needed, reseeding following construction and implementing a Noxious Weed Control Plan. Impacts to water resources from the construction of Route Segment 1c would include 11.6 miles of no identifiable and 1.3 miles of low impacts.

4.14.4.4 Route Segment 2a (Agency Preferred Alternative)

No long-term disturbance to water resources would occur with the construction of Route Segment 2a (Table 4.14-2). Construction in Route Segment 2a would result in approximately 0.6 acre of short-term ground disturbance to water resources. Short-term disturbance would occur at one stream crossing, Coyote Springs Creek. The flow in this stream would not be altered. The transmission line would free-span all streams and no structures would be placed in active channels. Impacts for Route Segment 2a would be similar to those described above for all route segments (Section 4.14.3). Disturbance along this route segment would be minimized by implementing erosion and sediment control, installing culverts of adequate size where needed, reseeding following construction and implementing a Noxious Weed Control Plan to reduce potential impacts from noxious weed establishment. Impacts to water resources from the construction of Route Segment 2a would include 0.9 mile of no identifiable impacts and 0.1 mile of low impacts.

4.14.4.5 Route Segment 2b

No long-term disturbance to water resources would occur with the construction of Route Segment 2b (Table 4.14-2). Construction in Route Segment 2b would disturb approximately 15.2 acres of water resources on a short-term basis. Short-term disturbance would occur at Firewater Canyon and 25 unnamed intermittent stream crossings. The flow in these streams would not be altered. The transmission line would free-span all streams and no structures would be placed in active channels. Impacts for Route Segment 2b would be similar to those described above for all route segments (section 4.14.3). Disturbance along this route segment would be minimized by implementing erosion and sediment control, installing culverts of adequate size where needed, reseeding following construction and implementing a Noxious Weed Control Plan to reduce potential impacts from noxious weed establishment. Impacts to water resources from the construction of Route Segment 2b would include 13.8 miles of no identifiable impacts and 2.6 miles of low impacts.

4.14.4.6 Route Segment 2c (Agency Preferred Alternative)

No long-term disturbance to water resources would occur with the construction of Route Segment 2c (Table 4.14-2). Construction in Route Segment 2c would disturb approximately 11.6 acres of water resources on a short-term basis. Short-term disturbance would occur at 22 unnamed intermittent stream crossings. The flow in these streams would not be altered. The transmission line would free-span all streams and no structures would be placed in active channels. Impacts for Route Segment 2c would be similar to those described above for all route segments (section 4.14.3). Disturbance along this route segment would be minimized by implementing erosion and sediment control, installing culverts of adequate size where needed, reseeding following construction and implementing a Noxious Weed Control Plan to reduce potential impacts from noxious weed establishment. Impacts to water resources from the construction of Route Segment 2c would include 15.9 miles of no identifiable impacts and 2.2 miles of low impacts.

4.14.4.7 Route Segment 2d (Agency Preferred Alternative)

No long-term disturbance to water resources would occur with the construction of Route Segment 2d (Table 4.14-2). Construction in Route Segment 2d would disturb approximately 7.6 acres of water resources on a short-term basis. Short-term disturbance would occur at Cold Creek and 12 unnamed intermittent stream crossings. The flow in these streams would not be altered. The transmission line would free-span all streams and no structures would be placed in active channels. Impacts for Route Segment 2d would be similar to those described above for and all route segments (section 4.14.3). Disturbance along this route segment would be minimized by implementing erosion and sediment control, installing culverts of adequate size where needed, reseeding following construction and implementing a Noxious Weed Control Plan to reduce potential impacts from noxious weed establishment. Impacts to water resources from the construction of Route Segment 2d would include 5.7 miles of no identifiable impacts and 1.3 miles of low impacts.

TABLE 4.14-2 LINEAR MILES CROSSED AND LONG-TERM DISTURBANCE TO WATER RESOURCES BY ROUTE SEGMENT (ACRES)

ROUTE SEGMENT	WATER RESOURCE TYPE (LINEAR MILES CROSSED AND ACRES DISTURBED)[1]										TOTAL MILES OF WATER RESOURCES CROSSED	TOTAL ACRES OF LONG-TERM DISTURBANCE TO WATER RESOURCES[2]
	CANAL/DITCH		INTERMITTENT STREAM/GULLY		PERENNIAL STREAM		RIVER		WETLAND			
	mi	ac	mi	ac	mi	ac	mi	ac	mi	ac	mi	ac
1a* 2.2 miles	0	0	0	0	0	0	0	0	0	0	0	0
1b* 12.5 miles	0	0	0.8	0	0.3	0	0	0	0	0	1.1	0
1c 12.9 miles	0	0	0.8	0	0.4	0	0	0	0	0	1.3	0
2a* 1.0 mile	0	0	0.1	0	0	0	0	0	0	0	0.1	0
2b 16.4 miles	0	0	2.6	0	0	0	0	0	0	0	2.6	0
2c* 18.1 miles	0	0	2.2	0	0	0	0	0	0	0	2.2	0
2d* 7.0 miles	0	0	1.3	0	0	0	0	0	0	0	1.3	0
3a* 0.1 mile	0	0	0	0	0	0	0	0	0	0	0	0
3b 21.7 miles	0	0	0.4	0	0	0	0	0	0	0	0.5	0
3c* 25.4 miles	0	0	0.2	0	0	0	0	0	0	0	0.8	0

Notes: [1]Miles crossed (mi) = inventory measurement; Acres (ac) = amount of long-term disturbance. [2]Acres of short-term disturbance are presented in the discussion section for each route segment. No long-term disturbance would occur to water resources.
*Route segments that comprise the Agency Preferred Alternative.

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4.14.4.8 Route Segment 3a (Agency Preferred Alternative)

No water resources were identified along Route Segment 3a. No impacts to water resources are anticipated for this short route segment (0.1 mile).

4.14.4.9 Route Segment 3b

No long-term disturbance to water resources would occur with the construction of Route Segment 3b (Table 4.14-2). Construction of Route Segment 3b would disturb approximately 2.1 acres of water resources on a short-term basis. Short-term disturbance would occur at Alkali Canyon, Hanson Creek, Sourdough Canyon Creek, and one unnamed intermittent stream. The flow in the Columbia River, creeks and streams would not be altered. The transmission line would free-span all streams and rivers and no structures would be placed in active channels. Impacts for Route Segment 3b would be similar to those described above for all route segments (Section 4.14.3).

Floodplains (100 year) associated with the Columbia River occur along a 0.1 mile section of this route segment; however, it is expected that the structures and/or access roads would not alter the storage capacity, grade or course that flood waters would take.

The segment of the Columbia River at Priest Rapids Lake has been listed as 303(d) water quality impaired due to temperature and pesticides from unknown sources. It is not anticipated that impacts from the construction of this route segment would further degrade water quality in this area.

Impacts along this route segment would be minimized by implementing erosion and sediment control, installing culverts of adequate size where needed, reseeding following construction and implementing a Noxious Weed Control Plan to reduce potential impacts from noxious weed establishment. Impacts to water resources from the construction of Route Segment 3b would include 21.3 miles of no identifiable impacts and 0.4 mile of low impacts.

4.14.4.10 Route Segment 3c (Agency Preferred Alternative)

No long-term disturbance to water resources would occur with the construction of Route Segment 3c (Table 4.14-2). Construction of Route Segment 3c would disturb approximately 4.4 acres of water resources on a short-term basis. Short-term disturbance would occur to two unnamed intermittent streams. The flow in the Columbia River, creeks and streams would not be altered. The transmission line would free-span all streams and rivers and no structures would be placed in active channels. The implementation of a Noxious Weed Control Plan would minimize additional wetland degradation from the treatment and invasion of noxious weeds.

Floodplains (100 year) associated with the Columbia River occur along a 0.6 mile section of this route segment; however, it is expected that the structures and/or access roads would not alter the storage capacity, grade or course that flood waters would take.

Lower Crab Creek has been listed as 303(d) water quality impaired due to pH, temperature and pesticides from unknown sources. It is not anticipated that impacts from the construction of this route segment would further degrade water quality in this area, because Lower Crab Creek would be spanned.

Impacts along this route segment would be minimized by implementing erosion and sediment control, installing culverts of adequate size where needed, reseeding following construction and implementing a Noxious Weed Control Plan to reduce potential impacts from noxious weed establishment. Impacts to water resources from the construction of Route Segment 3c would include 24.6 miles of no identifiable impacts and 0.8 mile of low impacts.

4.14.5 Mitigation Measures

The project design features and environmental protection measures described in Section 2.5 (Project Design Features Common to Action Alternatives) have been incorporated into the Project design and would be implemented during construction and operation of the proposed Project. These measures are designed to avoid or minimize environmental impacts from Project construction, operation and maintenance activities and are items that Pacific Power has committed to implement as part of the Project development; therefore, no additional mitigation for water resources would be required.

4.14.6 Impact Summary by Alternative

4.14.6.1 No Action

Under the No Action Alternative, the proposed Project would not be constructed or operated. No Project-related impacts to water resources would occur; however water resources would continue to be affected by current use in the area.

4.14.6.2 Route Alternatives

Table 4.14-3 presents a summary of the long-term impacts for each of the end-to-end alternatives and impact levels with the implementation of project design features.

No long-term disturbance to water resources would occur with the construction of any of the end-to-end alternatives. Differences in impact levels are very similar for all of the end-to-end alternatives, with the majority of the impacts categorized as no identifiable. Alternative B has the lowest number of miles of no identifiable impacts (55.5 miles), while Alternative H has the highest number of miles of no identifiable impacts (61.0 miles). Alternative C has the lowest number of miles of low impacts (5.1 miles), while Alternative F has the highest number of miles of low impacts (6.1miles). No moderate or high impacts to water resources are anticipated for any of the end-to-end alternatives.

TABLE 4.14-3 LINEAR MILES CROSSED, LONG-TERM DISTURBANCE TO WATER RESOURCES AND IMPACT SUMMARY OF END-TO-END ALTERNATIVES

END-TO-END ALTERNATIVES	WATER RESOURCE TYPE (LINEAR MILES CROSSED AND ACRES OF LONG-TERM DISTURBANCE)[1]										TOTAL AMOUNT OF WATER RESOURCES CROSSED (MILES) AND LONG-TERM DISTURBANCE (ACRES)		IMPACT LEVELS[2]			
	CANAL/DITCH		INTERMITTENT STREAM/GULLY		PERENNIAL STREAM		RIVER		WETLAND				HIGH	MODERATE	LOW	NO IDENTIFIABLE
	mi	ac	mi	ac	mi	ac	mi	ac	mi	ac	mi	ac	mi	mi	mi	mi
Alternative A 1a, 1b, 2a, 2b, 2d, 3a, 3c 64.5 miles	0	0	5.0	0	0.3	0	0	0	0	0	5.9	0	0	0	5.9	58.6
Alternative B 1a, 1b, 2a, 2b, 2d, 3a, 3b 61.0 miles	0	0	5.2	0	0.3	0	0	0	0	0	5.6	0	0	0	5.5	55.5
Alternative C 1a, 1b, 2a, 2c, 2d, 3a, 3b 62.8 miles	0	0	4.8	0	0.3	0	0	0	0	0	5.2	0	0	0	5.1	57.7
Alternative D (Agency Preferred Alternative) 1a, 1b, 2a, 2c, 2d, 3a, 3c 66.3 miles	0	0	4.6	0	0.3	0	0	0	0	0	5.5	0	0	0	5.5	60.8
Alternative E 1a, 1c, 2a, 2b, 2d, 3a, 3b 61.4 miles	0	0	5.2	0	0.4	0	0	0	0	0	5.7	0	0	0	5.7	55.7
Alternative F 1a, 1c, 2a, 2b, 2d, 3a, 3c 64.9 miles	0	0	5.0	0	0.4	0	0	0	0	0	6.0	0	0	0	6.1	58.8
Alternative G 1a, 1c, 2a, 2c, 2d, 3a, 3b 63.2 miles	0	0	4.8	0	0.4	0	0	0	0	0	5.3	0	0	0	5.3	57.9
Alternative H 1a, 1c, 2a, 2c, 2d, 3a, 3c 66.7 miles	0	0	4.6	0	0.4	0	0	0	0	0	5.6	0	0	0	5.7	61.0

Notes: [1]Miles crossed (mi) = inventory measurement; Acres (ac) = amount of long-term disturbance. [2]Impact levels are in linear miles. Impact levels are based on: resource sensitivity, resource quality, resource quantity, and the type and duration of impact (i.e. short- or long-term). Areas with no identifiable impacts include areas where no water resources are present. No long-term disturbance would occur to water resources. Rivers and Wetlands would be spanned, and no miles of impact would occur.
Project design features described in Chapter 2 are designed to reduce effects from the proposed Project; therefore, no additional mitigation would be required.

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4.15 GEOLOGY AND SOILS

4.15.1 Methods and Impact Types

4.15.1.1 Analysis Methods

Geology and soil resources may be affected by the construction, operation and maintenance of the Project. Relative sensitivity classes were developed for soils and geology/geohazards based on their occurrence and key physical characteristics. The geologic evaluation focused on geohazards, mapped and landslide areas. The presence or absence of mapped or potential geohazards resulted in high, moderate or low sensitivity and impacts. The overall sensitivity of soils were determined by using a combination of water erosion potential (i.e., Kw Factor), wind erosion potential (i.e., Wind Erosion Index), and restoration potential. Sensitivity ratings were categorized as high, moderate or low as previously stated. Table 4.15-1 summarizes geologic and soil resource sensitivity in the Project area.

TABLE 4.15-1 GEOLOGY AND SOIL RESOURCE SENSITIVITY CLASSIFICATIONS

FEATURE	SENSITIVITY
Known landslide areas	High
High wind erosion soils	High
High water erosion soils	High
Very steep terrain (30%+)	High
Moderate wind erosion potential soils	Moderate
Moderate water erosion potential soils	Moderate
Steep Terrain (15-30%)	Moderate
Low wind erosion potential soils	Low
Low water erosion potential soils	Low
Sloping to flat terrain (<15%)	Low

4.15.1.2 Impact Types

The duration of impacts to geology and soils can be short- or long-term. Impacts are considered short-term if they affect soil and geological resources for a period of several weeks to one month following construction. Impacts are considered long-term if they would affect soil and geological resources for greater than one month following construction.

Geologic hazards could directly and indirectly affect the construction, operation and maintenance of the Project, and geohazard impact types would include:

- Loss of equipment or injury to personnel as a result of landslides, especially in steep terrain; and
- Loss of electric transmission service as a result of seismic activity or landslides.

Soil impact types would include:

- Increased soil erosion in areas where construction activities have disturbed or altered the land surface by exposing soils (temporary);
- Construction of permanent access roads potentially resulting in accelerated wind and water erosion rates (permanent); and
- Degradation of the land surface and loss of soils resulting from accelerated soil erosion (temporary to permanent);
- Soil compaction resulting from construction activities, such as heavy construction equipment use (temporary to permanent).

Impacts on Prime Farmland are addressed in Section 4.4 Land Use.

4.15.2 Impact Levels

Potential impacts to geologic and soil resources were assessed along the assumed centerline of the proposed 230 kV transmission line and access roads. Impact levels were defined as follows:

High
Impacts would be considered high where:

- The Project would require construction on sites that have a high susceptibility to water erosion and low soil restoration potential and would create impacts lasting for greater than one year; and/or
- Known landslides are considered a potential high hazard and risk. Pre-construction geotechnical evaluation would further determine and characterize the hazard and risk level and engineering requirements to address the risk.

Moderate
Impacts would be considered moderate where:

- Construction takes place near a water body on highly erodible (wind or water erosion) soils that have moderate re-vegetation potential, with impacts lasting from one month to one year ;
- Construction takes place in areas of steep terrain (i.e., 30 percent slope or greater; Access Level 7); and/or
- The Project would require construction on sites that have a moderate susceptibility to water erosion or high susceptibility to wind erosion and low soil restoration potential, with impacts lasting from one month to one year; and/or
- Severe soil compaction (i.e., compaction is deeper than six inches) results from construction activities occurring on soils that are moist to wet.

Low
Impacts would be considered low where:

- The Project would cause short term (i.e., several weeks to one month) increases in erosion rates following soil disturbance prior to the effective establishment of erosion control measures and natural re-vegetation;
- Structures or access roads near water bodies would be constructed in low erodibility soils areas on gentle terrain, with little or no clearing;
- Structures or access roads near water bodies would be constructed away from water banks and little or no sediment is likely to reach the water;
- Road and facility construction and clearing would be required on soils with low or moderate erosion hazard and the potential for restoration would be high using standard erosion control methods; and/or
- Erosion levels would be at or near normal during or after construction; and/or
- The Project would cause short term (i.e., several weeks to one month) soil compaction (less than six inches) as a result of construction activities, such as heavy construction equipment use.

No identifiable impact would occur where: no geohazards are encountered along the Project assumed centerline or open water areas are crossed; soil impacts would be low where structures would be installed as part of the Project with project design features and best management practices (BMPs) in place.

4.15.3 Impacts Common to All Route Segments

4.15.3.1 Geology

Construction of access roads and transmission structures would alter the landscape in all route segments, causing long-term impacts. Geological hazards are found along the route segments as described below (also see Appendix A: Geohazards map). In general, potential mass movement (e.g., landslide) areas would present the greatest risk for potential injury to construction personnel or the public, and equipment loss and damage. Landslides might be trigged by seismic events, but could also occur as a result of significant rainfall events or construction activities such as road construction that may de-stabilize these areas and cause a mass movement event.

Liquefaction occurs when soils lose shear strength and deform during an earthquake, acting like quicksand which is capable of causing great damage to structures in the area. Liquefaction typically occurs in areas of loose sandy soils that are saturated with water, such as low-lying coastal areas, lakeshores, and river valleys. Liquefaction susceptibility maps have been prepared for each county in the state of Washington, including Yakima, Grant, Benton and Kittitas counties (WDGER 2010d). These maps provide an estimate of the likelihood that soil will liquefy as a result of earthquake shaking based on the physical characteristics of the soil, (e.g., grain texture, compaction, and depth of groundwater). Liquefaction susceptibility maps depict the relative hazard in terms of low, low to moderate and moderate to high liquefaction susceptibility (Geohazards Map-Appendix A). Liquefaction potential is described for each route segment and alternative below and summarized in Tables 4.15-2 and 4.15-3.

The potential for impact created as a result of seismic activity, however, and resulting soil liquefaction impact is expected to be low for all route segments because geotechnical investigations will provide a basis for engineering of the structures, and the chance for failure of the transmission line as a result of seismic activity would be very low. Transmission line structures are likely to survive settlement associated with liquefaction with little damage other than leaning, and the Columbia River crossing structures would be engineered with deep foundations, soil densification, avoidance or other measures where liquefaction risk is determined to be an issue during geotechnical investigations.

As with soil liquefaction, the presence of active faults is not likely to affect the construction or operation of the transmission line unless a mapped fault is present or an unmapped surface rupture is visible, efforts to locate structures to avoid all potential surface faults are not considered practicable. Where pre-construction geotechnical investigations identify evidence of surface ruptures, the line will span or avoid these areas if possible and appropriate engineering will minimize hazards to the operation of the transmission line. All practicable precautions will be taken to construct the Project facilities to withstand the projected ground shaking, lurching, lateral spreading, differential settlement and other hazards produced from a Maximum Probable Earthquake event.

Project design features will be implemented during construction and operation, and are anticipated to be effective at minimizing impacts to geological resources (refer to Section 2.5 Project Design Features Common to Action Alternatives). Project design features include: detailed geotechnical investigations as part of preliminary Project engineering; a pre-construction field verification of landslide prone areas and potential design changes to roads; using existing roads where practicable; minimizing blading and disturbance to plant communities; revegetating following construction; and implementing surface stabilization and erosion control.

4.15.3.2 Soils

Ground disturbance, changes in grade and changes in soil stability from construction activities can significantly impact soils susceptible to wind and water erosion. The Natural Resources Conservation Service (NRCS) considers slope and soil properties such as cohesion, drainage and organic content in determining soil erosion potential of soils.

Restoration potential is a measure of a soils ability to recover from degradation. The NRCS provides soil restoration potential ratings for each soil type, from low to high restoration potential. Soils with the ability to recover from degradation will have the best potential for revegetation and restoration once a construction project has been completed. Soil resilience is dependent upon adequate stores of organic matter, good soil structure, low salt and sodium levels, adequate nutrient levels, microbial biomass and diversity, adequate precipitation for recovery, and other soil properties. Soil restoration potential for the Project area is shown on both the Soil Erosion Potential by Water and Soil Erosion Potential by Wind Maps in Appendix A.

All soil types crossed by the Project route segments would be subject to some type and level of disturbance due to structure construction or road building. Soil surface disturbance, compaction, and relocation would occur to varying degrees. These disturbances would likely result in the potential for a small increase in wind and water erosion and compaction levels. Erosion rates would be estimated in the Storm Water Pollution Prevention Plan (SWPPP) and BMPs would be specified to reduce and control wind and water erosion for the approved route alternative. The SWPPP would be prepared as part of the Plan of Development (POD). Direct impacts to soil resources would primarily be related to road building activities and construction work areas. New roads, the clearing and grading of building pads in areas over eight percent slope, and structure base and foundation areas expected to be permanent disturbances.

Construction activities that remove vegetation and cause soil surface disturbance would potentially result in increased soil erosion rates. Erosion rates depend on site-specific characteristics including soil type, slope, and climatic conditions. Water erosion would generally be associated with localized precipitation events. Rapid snowmelt would have the potential to contribute to water erosion. The potential for wind erosion would be relatively similar across seasons, except when there is snow cover. Work areas and pulling and tensioning sites are expected to cause short term impacts by temporarily increasing soil erosion in areas where construction activities have disturbed or altered the land surface by exposing soils.

Soil types within the Project area have varying potentials for wind and water erosion. Detailed soil mapping units in the Project corridor have potential wind and water erosion risks ranging from low risk to high risk (see Appendix A: Soil Erosion Potential by Wind and Soil Erosion Potential by Water maps). Wind and water erosion could result in: loss of soil organic matter; reduced vegetation production due to soil loss; increased precipitation run-off; sediment loading to streams; and flooding. Wind and water erosion impacts would generally be short-term in duration.

Soil compaction could occur as a result of construction activities, such as heavy construction equipment use. Rubber-tired vehicles generally compact soils more than tracked vehicles. The extent of compaction would depend in large part on soil moisture content and the physical characteristics of a particular affected soil type. Compaction tends to be most severe when soils are moist to wet. Very dry and very wet soils generally do not compact as severely. Compaction impacts would generally be short-term in duration, but would have the potential to affect soil resources in the long-term if compaction is deeper than six inches. Compacted soil could reduce precipitation infiltration and increase the rate and amount of soil erosion.

Soil rutting could occur as a result of Project-related construction activities. In general, rutting is a concern when vehicle or construction equipment travel occurs during wet conditions. Rutting can restrict the movement of water through and across soil thus altering soil/water dynamics. Both tracked- and rubber-tired vehicles can cause rutting. However, standard rubber-tired vehicles typically have more potential for rutting than tracked or flotation tire equipment vehicles.

Soil displacement is typically caused by Project-related construction activities. Soil resources may be directly displaced by construction equipment. Road improvement, new road construction, and transmission structure placement could result in moving soil resources by construction equipment. These impacts would be localized and limited in terms of the effects to Project corridor soil resources.

The effective implementation project design features would minimize potential impacts to soils by minimizing disturbance in sensitive areas, implementing surface stabilization and erosion control, the re-establishment of native vegetation, and limiting construction operation during periods of high soil moisture or saturation.

4.15.4 Impacts Specific to Route Segments

4.15.4.1 Route Segment 1a (Agency Preferred Alternative)

Route Segment 1a crosses no faults and no mapped landslides. The majority of the route segment is located on slopes less than 15 percent, with 1.5 miles of the 2.2 mile route being under eight percent. The route segment would create long term disturbances of 1.8 acres on moderate wind erosion potential soils, and 1.6 acres on high and moderate water erosion potential soils. Impacts on 1.8 acres of moderate restoration potential soils would also occur. As described above for impacts common to all route segments, the effective implementation of project design features (Chapter 2) would minimize potential impacts to soil and geologic resources. Project design features include: using existing roads where practicable; minimizing blading and disturbance to plant communities; revegetating following construction; detailed geotechnical investigations as part of preliminary Project engineering; minimizing disturbance in sensitive areas; implementing surface stabilization and erosion control; limiting construction operation during periods of high soil moisture or saturation; and limiting ground disturbance. With the implementation of project design features, long-term impacts to soil and geologic resources from the construction of Segment 1a would be low for the entire route segment (2.2 miles). Table 4.15-2 summarizes long-term disturbance to geologic and soil resources by route segment.

4.15.4.2 Route Segment 1b (Agency Preferred Alternative)

Route Segment 1b crosses no faults and two mapped landslide areas totaling 1.0 mile of the route. This area also is mapped as low-moderate potential for liquefaction. The majority of the route segment, 9.5 miles, is located on slopes less than 15 percent, and 5.5 miles of the 12.5 mile route crosses slopes under eight percent. Steep slopes over 30 percent account for 0.8 mile of the route segment, and slopes between 15 percent and 30 percent account for 2.3 miles. However, access road construction will not occur in the steepest areas, and access levels will be 0, 2, 4, 5, or 6, with the steepest areas along the route centerline spanned. The route segment would create long term disturbances of 5.2 acres on moderate wind erosion potential soils, and long term disturbances of 5.0 acres and 6.2 acres on high and moderate water erosion potential soils, respectively. Impacts on 2.1 acres of moderate restoration potential soils and 4.8 acres of long term disturbance on low restoration potential soils would also occur. As described above for impacts common to all route segments, the effective implementation of project design features (Chapter 2) would minimize potential impacts to soil and geologic resources. With the implementation of project design features, long-term impacts to soil and geologic resources from the construction of Route Segment 1b include 2.3 miles of moderate and 10.2 miles of low impacts.

4.15.4.3 Route Segment 1c

Route Segment 1c crosses no faults and two mapped landslide areas totaling 1.7 miles of the route. This area also is mapped as low-moderate potential for liquefaction. The majority of the route segment is located on slopes less than 15 percent (9.5 miles), and 5.2 miles of the 12.9 mile route is under eight percent. Steep slopes over 30 percent account for 0.3 mile of the route segment, and slopes between 15 percent and 30 percent account for 3.2 miles. However, access road and transmission line construction will not occur in the steepest areas, and access levels will be 1 to 6, with the steepest areas along the route centerline spanned. The route segment would create long term disturbances of 7.9 acres on moderate wind erosion potential soils, and 7.1 acres and 15.2 acres on high and moderate water erosion potential soils, respectively. Impacts on 6.2 acres of moderate restoration potential soils and 4.8 acres of long term disturbance on low restoration potential soils would also occur. As stated above for impacts common to all route segments, potential impacts to soil and geologic resources would be minimized through the effective implementation of project design features (Chapter 2). Following the implementation of project design features, long-term impacts to soil and geologic resources from the construction of Segment 1c would include 0.9 mile of moderate and 12.0 miles of low impacts.

4.15.4.4 Route Segment 2a (Agency Preferred Alternative)

Route Segment 2a crosses no faults and no mapped landslide areas. The route segment crosses 0.8 mile and 0.2 mile of zero to eight percent and eight to 15 percent slopes, respectively. The route segment would create long term disturbances of 1.2 acres on moderate wind erosion potential soils, and 2.1 acres on high water erosion potential soils. As described above for impacts common to all route segments, the effective implementation of project design features (Chapter 2) would minimize potential impacts to soil and geologic resources. With the implementation of project design features, long-term impacts to soil and geologic resources from the construction of Route Segment 2a would be low for the entire 1.0 mile route segment.

4.15.4.5 Route Segment 2b

Route Segment 2b crosses no faults and one mapped landslide area totaling 0.2 mile of the route; this area also is mapped as low-moderate potential for liquefaction. The majority of the route segment is located on slopes less than 15 percent (14.2 miles), and 9.2 miles of the 16.4 mile route is under eight percent. Steep slopes over 30 percent account for 0.2 mile of the route segment, and slopes between 15 percent and 30 percent account for 1.8 miles. However, access road construction will not occur in the steepest areas, and access levels will be one to six for this route segment. The route segment would create long term disturbances of 14.8 acres on moderate wind erosion potential soils, and 15.2 acres and 20.5 acres on high and moderate water erosion potential soils, respectively. Impacts on 15.2 acres of moderate restoration potential soils and 14.1 acres of long term disturbance on low restoration potential soils would also occur. As stated above for impacts common to all route segments, potential impacts to soil and geologic resources would be minimized through the effective implementation of project design features (Chapter 2). Following the implementation of project design features, long-term impacts to soil and geologic resources from the construction of Route Segment 2b would be low for the entire route segment (16.4 miles).

4.15.4.6 Route Segment 2c (Agency Preferred Alternative)

Route Segment 2c crosses no faults and no mapped landslide areas. The majority of the route segment is located on slopes less than 15 percent, and 14.9 miles of the 18.1 mile route crosses slopes under eight percent. Steep slopes over 30 percent are not crossed along this route segment, and slopes between 15 percent and 30 percent account for 0.9 mile. The route segment would create long term disturbances of 13.9 acres on moderate wind erosion potential soils, and 17.0 acres and 3.0 acres on high and moderate water erosion potential soils, respectively. Impacts on 16.9 acres of moderate restoration potential soils and 2.8 acres of long term disturbance on low restoration potential soils would also occur. High impacts would occur for 0.1 mile where the Project is constructed in high water erosion potential soils with low restoration potential. As described above for impacts common to all route segments, the effective implementation of project design features (Chapter 2) would minimize potential impacts to soil and geologic resources. With the implementation of project design features, long-term impacts to soil and geologic resources from the construction of Route Segment 2c would include 0.1 mile of moderate and 18.0 miles of low impacts.

4.15.4.7 Route Segment 2d (Agency Preferred Alternative)

Route Segment 2d crosses no faults and one mapped landslide area totaling 1.9 miles of the route. The majority of the slope classes crossed for this route segment are those between eight percent and 15 percent (3.1 miles), and 15 percent to 30 percent (1.7 miles). Steep slopes over 30 percent account for 0.9 mile of the route segment and would cause moderate impacts where access road and work pad clearing and grading would occur (0.3 mile of the route segment). Access road construction will occur on some of the steepest areas (Access Level 7, MP 6.2-6.4), and no road construction would occur along the steepest segments of the route where helicopter structure placement and construction would occur Umtanum Ridge, between MP 6.6 and MP 7.0. The route segment would create long term disturbances of 10.3 acres on moderate wind erosion potential soils, and 10.2 acres and 4.3 acres on high and moderate water erosion potential soils, respectively. Impacts on 10.2 acres of moderate restoration potential soils and 4.0 acres of long term disturbance on low restoration potential soils would also occur. As stated above for impacts common to all route segments, potential impacts to soil and geologic resources would be minimized through the effective implementation of project design features (Chapter 2). Following the implementation of project design features, long-term impacts to soil and geologic resources from the construction of Route Segment 2d would be low for the entire route segment (7.0 miles).

4.15.4.8 Route Segment 3a (Agency Preferred Alternative)

Route Segment 3a crosses no faults and no mapped landslide areas. The route segment is located on slopes of eight percent or less. The route segment would create long term disturbances of 0.1 acre on high wind erosion potential soils. Impacts on 0.1 acre of low restoration potential soils would also occur. As described above for impacts common to all route segments, the effective implementation of project design features (Chapter 2) would minimize potential impacts to soil and geologic resources. With the implementation of project design features, long-term impacts to soil and geologic resources from the construction of Segment 3a would be low for the entire route segment (0.1 mile).

4.15.4.9 Route Segment 3b

Route Segment 3b crosses six faults and one mapped landslide area, located at the slope toe of the Umtanum Ridge along the Columbia River, totaling 0.5 mile of the route. Most of the faults would require further study to determine whether they are active. Much of the route segment directly adjacent to the Columbia River is mapped as moderate-high, low-moderate or low liquefaction potential, with moderate-high potential accounting for 9.1 miles of the route segment. Geotechnical investigations and site specific engineering in these areas will result in low impacts and minimal potential for structure failure, equipment damage, or potential injury to construction personnel. The majority of the route segment is located on slopes less than 15 percent, and 21.0 miles of the 21.7 mile route is under eight percent. Steep slopes over 30 percent account for 0.1 mile of the route segment, and slopes between 15 percent and 30 percent account for 0.2 mile. However, access road construction will not occur in the steepest areas, and access levels will be 0, 2, or 3, with the steepest areas spanned. The route segment would create long term disturbances of 1.3 acres on high and 21.5 acres on moderate wind erosion potential soils, and 18.5 acres and 5.8 acres on high and moderate water erosion potential soils, respectively. Impacts on 8.1 acres of moderate restoration potential soils and 7.7 acres of long term disturbance on low restoration potential soils would also occur. High impacts would occur for 1.2 miles where the Project would be constructed in high water erosion potential soils with low restoration potential. As stated above for impacts common to all route segments, potential impacts to soil and geologic resources would be minimized through the effective implementation of project design features (Chapter 2). Following the implementation of project design features, long-term impacts to soil and geologic resources from the construction of Route Segment 3b would include 1.2 miles of moderate and 20.1 miles of moderate impacts. No identifiable impacts would occur for 0.4 mile where the Project crosses the Columbia River.

4.15.4.10 Route Segment 3c (Agency Preferred Alternative)

Route Segment 3c crosses two mapped faults and one mapped landslide area, located on the slope toe of the Umtanum Ridge along the Columbia River, totaling 0.1 mile of the route. A portion of the route segment is mapped as moderate-high, low-moderate or low liquefaction potential, with moderate-high potential accounting for 2.3 miles of the route segment. Geotechnical investigations and site specific engineering in these areas will result in low impacts and minimal potential for structure failure, equipment damage, or potential injury to construction personnel. The majority of the route segment is located on slopes less than 15 percent, and 19.8 miles of the 25.4 mile route is under eight percent. Steep slopes over 30 percent account for 1.3 miles of the route segment, and slopes between 15 percent and 30 percent account for 2.2 miles of the route segment. Access road construction will occur on some of the steepest areas (Access Level 7, MP 17.7-17.8, 19.5-19.8), and no road construction would occur along the steepest segments of the route where helicopter structure placement and construction would occur in the Saddle Mountains, between MP 20.0 and MP 20.8. The route segment would create long term disturbances of 14.9 acres on high and 0.3 acres on moderate wind erosion potential soils, and 1.0 acre and 3.9 acres on high and moderate water erosion potential soils, respectively. Impacts on 4.9 acres of moderate restoration potential soils and 10.1 acres of long term disturbance on low restoration potential soils would also occur. High impacts would occur for 0.8 mile where the Project would be constructed in high water erosion potential soils with low restoration potential or crosses mapped landslide areas. As described above for impacts common to all route segments, the effective implementation of project design features (Chapter 2) would minimize potential impacts to soil and geologic resources. With the implementation of project design features, long-term impacts to soil and geologic resources from the construction of Route Segment 3c would include 0.2 mile of moderate and 24.9 miles of low impacts. No identifiable impacts would occur for 0.3 mile where the Project crosses the Columbia River.

TABLE 4.15-2 LONG-TERM DISTURBANCE TO GEOLOGIC AND SOIL RESOURCES BY ROUTE SEGMENT

	GEOLOGIC RESOURCES AND HAZARDS									SOIL RESOURCES (LINEAR MILES CROSSED, ACRES LONG-TERM DISTURBED, AND % OF RESOURCE TYPE DISTURBED BY TOTAL ROUTE SEGMENT)[1]																	
										SOIL ERODIBILITY POTENTIAL												RESTORATION POTENTIAL					
										WIND						WATER											
		SLOPE % (MILES CROSSED)					LIQUEFACTION POTENTIAL (MILES CROSSED)			HIGH			MODERATE			HIGH			MODERATE			LOW			MODERATE		
ROUTE SEGMENT	FAULTS (# CROSSED)	0-8	8-15	15-30	30+	MAPPED LANDSLIDES (HIGH HAZARD: MILES CROSSED)	LOW	LOW-MODERATE	MODERATE-HIGH	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%
1a* 2.2 miles	0	1.5	0.7	0.1	0	0	0	0	0	0	0	0	2.3	1.8	100.0	2.1	1.6	92.4	0.2	0.1	7.6	0	0	0	2.3	1.8	100.0
1b* 12.5 miles	0	5.5	4	2.3	0.8	1	0	1	0	0	0	0	5.0	5.2	46.3	4.8	5.0	44.8	7.8	6.2	55.2	4.2	4.8	42.3	2.9	2.1	19.0
1c 12.9 miles	0	5.2	4.3	3.2	0.3	1.7	0	1.7	0	0	0	0	5.0	7.9	34.3	4.4	7.1	30.8	7.6	15.2	65.8	3.7	5.9	25.5	3.7	6.2	26.8
2a* 1.0 mile	0	0.8	0.2	0	0	0	0	0	0	0	0	0	0.6	1.2	56.6	1.0	2.1	100.0	0	0	0.0	0	0	0	1.0	2.1	100.0
2b 16.4 miles	0	9.2	5.2	1.8	0.2	0.2	1.5	0.2	0	0	0	0	7.1	14.8	41.5	7.3	15.2	42.6	9.1	20.5	57.4	6.3	14.1	39.5	7.3	15.2	42.6
2c* 18.1 miles	0	15	2.4	0.9	0	0	6	0	0.6	0	0	0	11.1	13.9	61.3	12.7	17.0	75.0	1.6	3.0	13.4	1.6	2.8	12.5	12.6	16.9	74.7
2d* 7.0 miles	0	1.4	3.1	1.7	0.9	1.9	1.4	1.4	0.1	0	0	0	4.8	10.3	66.9	4.7	10.2	66.3	1.7	4.3	27.7	1.6	4.0	26.4	4.7	10.2	66.3
3a8 0.1 mile	0	0.2	0	0	0	0	0	0	0	0.2	0.1	100.0	0	0	0.0	0	0	0.0	0	0	0	0.2	0.1	100.0	0	0	0
3b 21.7 miles	6	21	0.5	0.2	0.1	0.5	0.4	0.8	9.1	1.8	1.3	4.2	15.2	21.5	69.5	12.4	18.5	59.8	4.3	5.8	18.8	6.3	7.7	24.9	6.7	8.1	26.1
3c* 25.4 miles	2	20	2	2.2	1.3	0.1	1.5	5.1	2.3	12.5	14.9	56.6	0.5	0.3	1.0	0.7	1.0	3.7	3.6	3.9	14.8	9.4	10.1	38.3	3.3	4.9	18.5

Notes: [1]Miles crossed (mi) = inventory measurement; Acres (ac) = amount of long-term disturbance; % = percent of soil type or restoration potential disturbed compared to the total amount of disturbance for the Route.
*Route segments that comprise the Agency Preferred Alternative.

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4.15.5 Mitigation Measures

The project design features and environmental protection measures described in Section 2.5 (Project Design Features Common to Action Alternatives) have been incorporated into the Project design and would be implemented during construction and operation of the proposed Project. These project design features and environmental protection measures are designed to reduce, avoid or minimize environmental impacts to soils and geological resources from Project construction, operation and maintenance activities and are items that Pacific Power has committed to implement as part of the Project development; therefore, no additional mitigation would be required.

4.15.6 Impact Summary By Alternative

4.15.6.1 No Action

Under the No Action Alternative, the proposed Project would not be constructed or operated. No Project-related impacts to soils and geology would occur; however soils and geology would continue to be affected by current use and conditions in the area.

4.15.6.2 Route Alternatives

All of the Alternatives are similar in their impacts to geologic and soil resources, with low impacts occurring along 94 to 98 percent of the Alternative length. In general, Alternatives B and C would have the greatest percentage of their total mileage with moderate impacts to geological and soil resources (3.5 miles/6 percent and 3.6 miles/6 percent respectively). Alternatives F and H would have the greatest percentage of low impacts to soils and geology (63.5 miles/98 percent and 65.2 miles/98 percent respectively). Alternative E would have the greatest distance of high landslide hazard area crossing and Alternative D (Agency Preferred Alternative) would cross the least amount of high landslide hazard area. Table 4.15-3 presents a summary of the impacts associated with each alternative.

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TABLE 4.15-3 LONG-TERM DISTURBANCE TO GEOLOGIC AND SOIL RESOURCES BY ALTERNATIVE

ALTERNATIVE	GEOLOGIC RESOURCES AND HAZARDS									SOIL RESOURCES (LINEAR MILES CROSSED, ACRES LONG-TERM DISTURBED, AND % OF RESOURCE TYPE DISTURBED BY TOTAL ROUTE SEGMENT)[1]																		IMPACT (MILES)			
										SOIL ERODIBILITY POTENTIAL												RESTORATION POTENTIAL									
										WIND						WATER															
	FAULTS (# CROSSED)	SLOPE % (MILES CROSSED)				MAPPED LANDSLIDES (HIGH HAZARD: MILES CROSSED)	LIQUEFACTION POTENTIAL (MILES CROSSED)			HIGH			MODERATE			HIGH			MODERATE			LOW			MODERATE						
		0-8	8-15	15-30	30+		LOW	LOW-MODERATE	MODERATE-HIGH	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	mi	ac	%	HIGH	MODERATE	LOW	NO IDENTIFIABLE
Alternative A 1a, 1b, 2a, 2b, 2d, 3a, 3c 64.5 miles	2	38.0	15.2	8.1	3.2	3.2	4.4	7.7	2.4	12.7	15.0	16.2	20.3	33.5	36.2	20.6	35.1	37.9	22.4	35.0	37.8	21.7	33.1	35.8	21.5	36.2	39.1	0	2.5	61.7	0.3
Alternative B 1a, 1b, 2a, 2b, 2d, 3a, 3b 61.0 miles	6	39.2	13.7	6.1	2.0	3.6	3.3	3.4	9.2	2.0	1.4	1.5	35.0	54.7	56.3	32.3	52.6	54.1	23.1	36.9	38.0	18.6	30.8	31.6	24.9	39.4	40.6	0	3.5	57.1	0.4
Alternative C 1a, 1b, 2a, 2c, 2d, 3a, 3b 62.8 miles	6	44.9	10.9	5.2	1.8	3.4	7.8	3.2	9.8	2.0	1.4	1.7	39.0	53.8	63.9	37.7	54.4	64.6	15.6	19.5	23.1	13.9	19.5	23.2	30.2	41.1	48.9	0	3.6	58.8	0.4
Alternative D (Agency Preferred Alternative) 1a, 1b, 2a, 2c, 2d, 3a, 3c 66.3 miles	2	43.7	12.4	7.2	3.0	3.0	8.9	7.5	3.0	12.7	15.0	18.9	24.3	32.6	41.0	26.0	36.9	46.4	14.9	17.5	22.0	17.0	21.9	27.5	26.8	37.9	47.7	0	2.6	63.4	0.3
Alternative E 1a, 1c, 2a, 2b, 2d, 3a, 3b 61.4 miles	6	38.9	14.0	7.0	1.5	4.3	3.3	4.1	9.2	2.0	1.4	1.3	35.0	57.4	52.7	31.9	54.7	50.2	22.9	45.9	42.1	18.1	31.9	29.2	25.7	43.5	39.9	0	2.1	58.9	0.4
Alternative F 1a, 1c, 2a, 2b, 2d, 3a, 3c 64.9 miles	2	37.7	15.5	9.0	2.7	3.9	4.4	8.4	2.4	12.7	15.0	14.4	20.3	36.2	34.7	20.2	37.2	35.6	22.2	44.0	42.1	21.2	34.2	32.8	22.3	40.3	38.6	0	1.1	63.5	0.3
Alternative G 1a, 1c, 2a, 2c, 2d, 3a, 3b 63.2 miles	6	44.6	11.2	6.1	1.3	4.1	7.8	3.9	9.8	2.0	1.4	1.5	39.0	56.5	58.9	37.3	56.5	58.8	15.4	28.4	29.6	13.4	20.6	21.5	31.0	45.2	47.1	0	2.2	60.6	0.4
Alternative H 1a, 1c, 2a, 2c, 2d, 3a, 3c 66.7 miles	2	43.4	12.7	8.1	2.5	3.7	8.9	8.2	3.0	12.7	15.0	16.4	24.3	35.3	38.6	25.6	38.9	42.6	14.7	26.5	29.0	16.5	23.0	25.2	27.6	42.0	45.9	0	1.2	65.2	0.3

Notes: [1]Miles crossed (mi) = inventory measurement; Acres (ac) = amount of long-term disturbance; % = percent of soil type or restoration potential disturbed compared to the total amount of disturbance for the Alternative.

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4.16 PUBLIC HEALTH AND SAFETY

This section provides an overview of electric and magnetic fields (EMF) and corona effects (audible and radio noise), and the effects of construction noise. The EMF discussion presents the predicted levels of electric and magnetic fields for the proposed Project. This section also summarizes existing EMF guidelines and standards; provides an overview of EMF health studies; and discusses interference, audible noise, radio and television interference, potential or induced stray voltage from the transmission line and potential impacts on equipment used near the line such as satellite receivers, global positioning system (GPS) units and cell phones.

4.16.1 Regulatory Framework

Applicable guidelines or regulations that may apply to electric and magnetic fields, audible noise or radio noise, pacemakers, and induced currents and voltages are discussed in this section.

4.16.1.1 Electric and Magnetic Fields

Regulations that apply to transmission line electric and magnetic fields fall into two categories. Safety standards or codes are intended to limit or eliminate electric shocks that could cause serious injury or cause fatalities. Field limits or guidelines are intended to limit electric and magnetic field exposures that can cause nuisance shocks or that were developed to protect health and safety based upon reviews and evaluations of relevant health research.

The proposed line would be designed to meet the National Electrical Safety Code (NESC, C2-2012), which in terms of transmission line design specifies proper clearances of the transmission and distribution line conductors must be from the ground and other objects. The clearances specified in the code provide safe distances that prevent harmful shocks to workers and the public. In addition, people who live and work near power lines must be aware of safety precautions to avoid electrical (which is not necessarily physical) contact with the conductors. For example, farmers should not up-end irrigation pipes under a transmission or other electrical line or direct the water stream from an irrigation system into or near the conductors. In addition as a matter of safety, the NESC specifies that electric field induced currents from transmission lines must be below the five milliampere (mA) (“let go”) threshold deemed a lower limit for primary shock.

Field limits or guidelines have been adopted in several states and countries, and by national and international organizations. Electric field limits have generally been based on minimizing nuisance shocks or field perception. The intent of magnetic field limits has been to limit exposure to existing level currently experienced by the public.

There are currently no national standards or federal regulations or guidelines for 60-hertz (Hz) electric and magnetic fields. The federal government performed an extensive review of field related issues in the 1990s that resulted in the decision that regulatory actions were not warranted (NIEHS 1999).

Although there are no federal regulations on low frequency electric and magnetic fields in the United States, recommendations and guidelines exist with the international community. Table 4.16-1 lists the electric and magnetic field guidelines recommend by the European Union, the International Committee on Electromagnetic Safety (ICES) and the International Commission on Non-Ionizing Radiation Protection, an affiliate of the World Health Organization (ICES 2002; ICNIRP 1998). Table 4.16-2 lists electric and magnetic field regulations established in other states.

Seven states have adopted limits for electric field strength at the edge or within the right-of-way (ROW) of a transmission line. Only Florida and New York currently limit magnetic field levels from transmission lines. The magnetic field guidelines for these two states only apply at the edge of the ROW and were based on an objective of preventing field levels from increasing beyond levels currently experienced by the public.

TABLE 4.16-1 INTERNATIONAL GUIDELINES FOR ALTERNATING CURRENT (AC) ELECTRIC AND MAGNETIC FIELD LEVELS

AGENCY	LOCATION	ELECTRIC FIELD	MAGNETIC FIELD
European Union General Public Exposure	Edge of ROW	4.2 kilovolt per meter (kV/m)	0.833 G (833 mG)
International Committee on Electromagnetic Safety Occupational Exposure	Within ROW	10 kV/m	27.1 G (27,000 mG)
General Public Exposure	Edge of ROW	5 kV/m	9.04 G (9,040 mG)
International Commission on Non-Ionizing Radiation Protection (ICNIRP) Occupational Exposure	Within ROW	8.3 kV/m	4.17 G (4,170 mG)
General Public Exposure	Edge of ROW	4.2 kV/m	0.833 G (833 mG)

1/ 20 kV/m in controlled occupation setting
Magnetic fields are measured in Gauss (G) and milligauss (mG). Please note that 1 G = 1,000 mG.

TABLE 4.16-2 STATE REGULATED AC ELECTRIC AND MAGNETIC FIELD LEVELS

STATE	LOCATION	ELECTRIC FIELD	MAGNETIC FIELD
Florida 500 kilovolt (kV) Lines - single circuit - double circuit 230 kV or less	 Within ROW Edge of ROW Within ROW Edge of ROW	 10 kV/m 2 kV/m 2 kV/m 8 kV/m 2 kV/m	 NA 200 mG 250 mG NA 150 mG
Minnesota	Within ROW	8 kV/m	NA
Montana	Within ROW – road crossing Edge of ROW	7 kV/m 1 kV/m[1]	NA NA
New Jersey	Within ROW Edge of ROW	NA 3 kV/m	NA NA
New York	Within ROW – open Within ROW – public road Edge of ROW	11.8 kV/m 7 kV/m 1.6 kV/m	NA NA 200 mG
North Dakota	Within ROW Edge of ROW	9 kV/m NA	NA NA
Oregon	Within ROW Edge of ROW	9 kV/m NA	NA NA

[1]Can be waived by landowner; NA = Not Applicable. No requirements.

4.16.1.2 Audible Noise

Federal, state, and county noise regulations, ordinances, and guidelines were reviewed to determine the regulatory context of audible noise within the Project area. With the exception of the United States Occupational Health and Safety Administration regulations that describe worker health and safety limits for noise exposure, there are no federal or state regulatory requirements for the audible noise level from transmission lines. Also, there are no standardized regulatory impact criteria for the assessment of construction noise directly applicable to this Project. The regulatory framework at the federal, state, and local levels is presented below.

Federal

The U.S. Environmental Protection Agency (EPA) has developed widely accepted recommendations for long-term exposure to environmental noise with the goal of protecting public health and safety. Noise guidelines for similar linear construction projects have been developed by the U.S. Department of Transportation (USDOT).

U. S. Environmental Protection Agency

The EPA has audible noise guidelines developed for the protection of public health and welfare that are widely accepted by state and local governments for the long-term exposure to environmental noise (EPA 1974). The EPA employs the equivalent sound level (L_{eq}) and day-night sound level (L_{dn}) metrics in its guidelines. The L_{eq} is the energy averaged sound level over a specified time, whereas the L_{dn} is a 24 hour average sound level that includes a 10 dBA penalty to sound levels during nighttime hours (10:00 p.m. – 7:00 a.m.). The EPA guideline lists an L_{dn} of 55 dBA to protect the public from interference to activity or annoyance outdoors in residential areas. Table 4.16-3 provides a summary of EPA audible noise guidelines.

TABLE 4.16-3 SUMMARY OF EPA GUIDELINES FOR AUDIBLE NOISE

LOCATION	LEVEL	CONCERN
All public accessible areas with prolonged exposure	70 A-weighted decibels (dBA) $L_{eq(24th)}$	Protection for safety/hearing loss
Outdoor at residential structures or other noise sensitive areas where large amounts of time spent	55 dBA L_{dn}	Protection against annoyance and activity interference
Outdoor areas where limited amounts of time are spent (parks, school yards, golf courses, etc.)	55 dBA $L_{eq\ (24th)}$	
Indoor residential	45 dBA L_{dn}	
Indoor non-residential	45 dBA $L_{eq\ (24th)}$	

U. S. Department of Transportation

The USDOT has identified criteria for the assessment of short- and long-term construction activities for both stationary and mobile projects, and specifically for linear projects. The Federal Highway Administration recommends abatement of construction noise that exceeds maximum levels at Noise Sensitive Areas (NSAs). These Project construction noise criteria take into account the daily pattern of construction activities, the absolute noise levels during construction activities, the duration of the construction, and the adjacent land use. While these criteria were not developed to specifically address construction noise impact for power transmission line projects, the guidelines shown in Table 4.16-4 provide reasonable criteria for noise assessment. If these criteria are exceeded, adverse community reaction may result.

TABLE 4.16-4 SUMMARY OF USDOT SHORT-TERM DURATION CONSTRUCTION NOISE GUIDELINES

LOCATION	DAYTIME	NIGHTTIME
Short Duration Noise Guidelines		
NSAs (Residences)	90 dBA L_{eq} (8h)	80 dBA L_{eq} (8h)
Commercial	100 dBA L_{eq} (8h)	100 dBA L_{eq} (8h)
Industrial	100 dBA L_{eq} (8h)	100 dBA L_{eq} (8h)
Moderate Duration Noise Guidelines		
NSAs (Residences)	80 dBA L_{eq} (8h)	70 dBA L_{eq} (8h)

LOCATION	DAYTIME	NIGHTTIME
Commercial	85 dBA L_{eq} (8h)	85 dBA L_{eq} (8h)
Industrial	90 dBA L_{eq} (8h)	90 dBA L_{eq} (8h)

State

The Washington Administrative Code (WAC 173-60) provides noise limitation levels by class of property. These levels are based on the environmental designation for noise abatement (EDNA) that is defined as "an area or zone (environment) within which maximum permissible noise levels are established." There are three EDNA designations (WAC 173-60-030), which roughly correspond to residential, commercial/recreational, and industrial/agricultural uses:

- Class A: Lands where people reside and sleep;
- Class B: Lands requiring protection against noise interference with speech; and
- Class C: Non-residential lands where economic activities are of such a nature that higher noise levels are anticipated.

Section 173-60 of the WAC provides the applicable noise standards for Washington State, including Kittitas, Grant, Benton, and Yakima Counties in addition to county standards (detailed below). The noise limits listed in WAC 173-60-40 are legal limits that cannot be exceeded without obtaining a variance from state regulations. Transmission lines are classified as industrial, and can cause the maximum permissible operational noise level of 60 dBA to intrude into residential property. During nighttime hours (10 p.m. to 7 a.m.), the maximum permissible limit for noise from industrial to residential areas is reduced to 50 dBA. The latter level applies to transmission lines that operate continuously (see Corona Noise in Section 4.16.3.2).

The following are exempted from the limits detailed in WAC 173-60 (per WAC 173-60-050):

- Construction noise (including blasting) between the hours of 7 a.m. and 10 p.m.;
- Motor vehicles operated on public highways;
- Motor vehicles operated off public highways, except when such noise affects residential receivers; and
- Noise from electrical substations is exempted from the nighttime limits (WAC 173-60-050[2][a]).

County

All but one county crossed by the proposed Project have relevant noise ordinances in place. The Kittitas County has not established independent state-approved noise standards, and instead relies on state nuisance regulations.

Chapter 6A.15 of the Benton County Code covers nuisance noise in the county. Sounds created by "construction or refuse removal equipment" are exempt from this ordinance. No other standards are applicable to the Project.

County Code Chapter 6.24 addresses nuisance noise in Grant County. Sounds created by helicopters and those created by the "installation or repair of essential utility services" are exempt from the provisions of the code at all hours. Between 7 a.m. through 10 p.m., sounds created as a result of blasting are exempt, and sounds "emanating from temporary construction sites" are exempt from 7 a.m. through 10 p.m., or when conducted beyond one thousand feet of any residence where human beings reside and/or sleep, at any hour.

Similarly, County Code Chapter 6.28 addresses nuisance noise in Yakima County. Sounds are exempt from the provisions of the code include those created by "construction or refuse removal equipment" and those created by lawfully established "commercial and industrial uses". No other standards are applicable to the Project.

4.16.1.3 Radio Noise

Neither Washington nor any other state has limits for either radio interference or television interference. Electromagnetic interference from power transmission systems in the United States is governed by the Federal Communication Commission (FCC) Rules and regulations (FCC 1988). A power transmission line is categorized by the FCC as an "incidental radiation device." It is defined as "a device that radiates radio frequency energy during the course of operation although the device is not intentionally designed to generate radio frequency energy." Such a device "shall be operated so that the radio frequency energy that is emitted does not cause harmful interference. In the event that harmful interference is caused, the operator of the device shall promptly take steps to eliminate the harmful interference." In this case "harmful interference "is defined as "any emission, radiation or induction which endangers the functioning of a radio navigation service or of other safety services or seriously degrades, obstructs or repeatedly interrupts a radio communication service operating in accordance with this chapter" (FCC 1988).

Complaints related to corona-generated interference are infrequent. The advent of cable or satellite television with the move to digital broadcast television in June 2009 also reduces the possibility of corona-generated interference. Cable, satellite, and digital broadcast are generally not subject to corona-generated interference. Electric power companies have been able to work quite well under the present FCC rule because harmful interference can generally be eliminated or effectively mitigated.

4.16.2 Electric and Magnetic Fields

This section discusses basic EMF theory, presents EMF modeling assumptions, methods and results for the proposed Project and a summary of EMF and health concerns.

4.16.2.1 Electric Fields

The potential or voltage (e.g., electrical pressure) on an object causes an electric field. Any object with an electric charge on it has a voltage at its surface, caused by the accumulation of more electrons on that surface compared with another object or surface. The voltage effect is not limited to the surface of the object but exists in the space surrounding the object in diminishing intensity. Electric fields can exert a force on other electric charges at a distance. The change in voltage over distance is known as the electric field. The units describing an electric field are volts per meter (V/m) or kV/m. These units are measures of the difference in electrical potential or voltage that exists between two points about three feet apart. The electric field becomes stronger near a charged object and decreases with distance away from the object.

Electric fields are very common phenomena. Static electric fields can result from friction generated when taking off a sweater, sliding across a car seat or walking across a carpet. Body voltages as high as 16,000 volts have been measured as a result of walking on a carpet (Chakravarti and Pontrelli 1976). The earth creates a natural static electric field in fair weather that is a result of the 300,000 to 400,000 volt potential difference between the ionosphere and the surface of the earth (Veimeister 1972). At ground level the average value of the earth's electric field is approximately 120 V/m, meaning that a six foot tall person would have a static potential of about 220 volts between the top and bottom of the body.

The normal fair weather static electric field of the earth varies from month to month, reaching a maximum of about 20 percent above normal in January, when the earth is closest to the sun, and falling to about 20 percent below normal by July, when the earth is farthest from the sun. Much stringer static electric potential can exist underneath storm clouds, where the electric potential of clouds (with respect to earth) can reach 10 to 100 million volts. Natural static electric fields under clouds and in dust storm can reach 3 to 10kV/m (Veimeister 1972).

All household appliances and other devices that operate on electricity create electric fields; however these fields are different from the earth's static or direct current (DC) field, and some comparison between DC and alternating current (AC) field may not be appropriate. Fields produced by electrical appliances that use AC reverse direction at a frequency of 60 cycles per second (60 Hz) in the United States. In many other countries, this frequency is 50 Hz. The electric field in this case is caused by the changing electric voltage of the appliance. The magnitude of the electric field decreases rapidly with distance from the device. The field caused by compact and small dimension household appliances generally attenuates more rapidly with distance than line source fields (such as from power lines). Appliances need not be in operation to create an electric field. Just plugging in an appliance into an outlet creates an electric field around it. Typical values of a field measured 1 foot away from some common appliances are shown in Table 4.16-5 (Carstensen 1985; Enertech Consultants 1985).

TABLE 4.16-5 TYPICAL ELECTRIC FIELD VALUES FOR APPLIANCES, AT 12 INCHES

APPLIANCE	ELECTRIC FIELD (KV/M)
Electric Blanket	0.25*
Broiler	0.13
Refrigerator	0.06
Iron	0.06
Hand Mixer	0.05
Coffee Pot	0.03

* 1 to 10 kV/m next to blanket wires
Source: Carstensen 1985; Enertech Consultants 1985.

4.16.2.2 Transmission Line Electric Fields

In the United States, electric power transmission lines create 60 Hz electric fields. These fields result from the voltage of the transmission line; the higher the voltage on the line, the higher the electric field levels associated with that line. Electric field strengths from a transmission line decrease with distance away from the outmost conductor; typically at a rate of approximately one divided by the distance squared ($1/d^2$). As an example, in an unperturbed field, if the electric field strength is 10 kV/m at a distance of one meter away, it will be approximately 2.5 kV/m at two meters away and 0.625 kV/m at four meters away. In contrast, the electric field strength from a single conductor typically decreases at a rate of approximately one divided by the distance (1/d). As an example, an electric field strength of 10kV/m at one meter away would decrease to approximately 5.0 kV/m at two meters away, and 2.5 kV/m at four meters away. Electric field strengths for a transmission line remain relatively constant over time because the voltage of the line does not vary significantly.

Transmission line electric fields are affected by the presence of grounded and conductive objects. Tress and building for example, can significantly reduce ground level electric fields by shielding the areas nearby (Deno and Silva 1987).

4.16.2.3 Magnetic Fields

An electric current flowing in a conductor (such as electric equipment, household appliances, and power circuits) creates a magnetic field. The most commonly used magnetic field intensity unit of measure is the Gauss (G). For most practical applications, the Gauss is too large, so a much smaller unit, the milliGauss (mG) is used for reporting magnetic field magnitudes. One milliGauss is one thousandth of a Gauss.

As a general reference, the earth has a natural static or DC magnetic field of about 0.570 G or 570 mG (Merrill and McElhinny 1983). As with electric fields, the magnetic fields from electric power facilities and appliances differ from static (DC) fields because they are caused by the flow of 60 Hz AC. Power frequency magnetic fields reverse direction at a rate of 60 cycles per second corresponding to the 60 Hz operating frequency of power systems in the United States.

Because the magnetic field is caused by the flow of an electric current, a device must be operated to create a magnetic field. The magnetic field strengths of a large number of common household appliances were measured by the Illinois Institute of Technology Research (IITRI 1984) for the U.S. Navy (Gauger 1985), and by Enertech Consultants for the Electric Power Research Institute (EPRI) (Silva et al. 1989). Typical magnetic field values for some appliances have been measured as low as 0.3 mG to as high as 20,000 mG (Table 4.16.-6). These appliances operate at 60 Hz AC and produce power-frequency AC magnetic fields (as opposed to other devices such as Magnetic Resonance Imaging [MRI] machines that use DC magnetic fields or Computer Tomography [CT] scanners that use high frequency x-rays).

TABLE 4.16-6 SUMMARY OF EPA GUIDELINES FOR MAGNETIC FIELD

APPLIANCE	MAGNETIC FIELD AT 12 INCHES AWAY (mG)	MAXIMUM MAGNETIC FIELD (mG)
Electric Range	3 to 30	100 to 1,200
Electric Oven	2 to 25	10 to 50
Garbage Disposal	10 to 20	850 to 1,250
Refrigerator	0.3 to 3	4 to 15
Clothes Washer	2 to 30	10 to 400
Clothes Dryer	1 to 3	3 to 80
Coffee Maker	0.8 to 1	15 to 250
Toaster	0.6 to 8	70 to 150
Crock Pot	0.8 to 1	15 to 80
Iron	1 to 3	90 to 300
Can Opener	35 to 250	10,000 to 20,000
Blender, Popper, Processor	6 to 20	250 to 1,050
Vacuum Cleaner	20 to 200	2,000 to 8,000
Portable Heater	1 to 40	100 to 1,100
Fans/Blowers	0.4 to 40	20 to 300
Hair Dryer	1 to 70	60 to 20,000
Electric Shaver	1 to 100	150 to 15,000
Fluorescent Light Fixture	2 to 40	140 to 2,000
Fluorescent Desk Lamp	6 to 20	400 to 3,500
Circular Saws	10 to 250	2,000 to 10,000
Electric Drill	25 to 35	4,000 to 8,000

Many sources of magnetic field are encountered in everyday activities. Typical sources of these fields include powerlines (i.e., both transmission and distribution), home and office appliances, tools, building wiring and currents flowing on water pipes. The importance of these sources to overall exposure varies considerably. For example, if a residence is very close, such as within 50 feet to a transmission line or even a distribution line (which runs near most everyone's residence), these sources could be the dominant, but not necessarily the only source of magnetic fields in the home. Depending on the circumstances, other sources may produce equal or greater magnetic field magnitudes. Several major research projects have been conducted to evaluate public exposure to ambient 60 Hz magnetic fields. This work was done to identify typical level encountered by people inside homes and elsewhere. A random survey of 1,000 residences in the United States reported that currents flowing on water pipes and on other components of house grounding systems are twice as likely as outside powerlines to be the source of the highest magnetic fields measured in homes (Zaffanella 1993). In another study, a large number of residences located throughout the United States were measured to determine the sources and characteristics of residential magnetic fields (Enertech 1993). During this study, spot (point-in-time) magnetic field measurements were taken in the rooms approximately 1,000 residences (Table 4.16-7). The average value for all rooms measured was 0.9 mG.

Another comprehensive study of contemporary magnetic field personal exposure was performed by the U.S. Department of Energy (Enertech 1998). The objective of this work was to characterize personal magnetic field exposure of the general population. This was accomplished by randomly selecting more than 1,000 people throughout the United States and recruiting them to wear a recording magnetic field meter during a typical 24-hour period, including all activity inside of, and away from, the place of residence. The measurement population (both genders) included about 874 adults and 138 children. People can experience a wide range of magnetic field exposures and sources. The United States 24-hour average for all people in the study was 1.25 mG. Most of the population was exposed to less than 1.0 mG (Table 4.16-8), but exposure levels also varied by occupation (Table 4.16-9).

TABLE 4.16-7 SUMMARY OF SPOT ROOM MEASUREMENTS IN THE UNITED STATES (992 RESIDENCES) (MG)

VALUES EXCEEDED IN:	ALL ROOMS MEDIAN	AVERAGE	KITCHEN	BEDROOM(S)	HIGHEST ROOM*
50% of Residences	0.5	0.6	0.7	0.5	1.1
25% of Residences	1.0	1.1	1.2	1.0	2.1
10% of Residences	1.7	2.1	2.4	2.0	3.8
5% of Residences	2.6	3.0	3.5	2.9	5.6
1% of Residences	5.8	6.6	6.4	7.7	12.2

* Any room in which spot field measurement had the highest value
Source: Enertech 1993

TABLE 4.16-8 PERCENTAGE OF U.S. POPULATION WITH AVERAGE FIELD EXPOSURE EXCEEDING GIVEN VALUES (BASED ON 1998 POPULATION OF 267 MILLION)

AVERAGE 24-HOUR FIELD	ESTIMATED PERCENTAGE OF POPULATION	95% CONFIDENCE INTERVAL (%)	POPULATION RANGE
>0.5 mG	76.3	73.8-78.9	197-211 million
>1 mG	43.6	41-46.5	109-124 million
>2 mG	14.3	11.9-17.2	31.8-45.9 million
>3 mG	6.3	4.8-8.3	12.8-22.2 million
>4 mG	3.35	2.4-4.7	6.4-12.5 million
>5 mG	2.42	1.67-3.52	4.5-9.4 million
10 mG	0.43	0.21-0.90	0.56-2.4 million
15 mG	0.1	0.02-0.55	50 thousand-1.5 million

Source: Enertech 1998; Silva 1999.

TABLE 4.16-9 AVERAGE MAGNETIC FIELD EXPOSURE DURING WORK FOR DIFFERENT OCCUPATIONS

OCCUPATION	NUMBER OF PEOPLE	AVERAGE MAGNETIC FIELD AT WORK
Managerial, professional, specialty	204	1.64 mG
Technical, sales, administrative, support	166	1.58 mG
Service: Protective, food, health, cleaning	71	2.74 mG

OCCUPATION	NUMBER OF PEOPLE	AVERAGE MAGNETIC FIELD AT WORK
Farming, forestry, fishing	19	0.91 mG
Precision production, craft, repair, operators, fabricators, laborers	128	1.73 mG
Electrical	16	2.15 mG

Source: Enertech 1998; Silva 1999.

4.16.2.4 Transmission Line Magnetic Fields

Electric power transmission lines also create magnetic fields. These fields are generated by the current (amperes) flowing on the phase conductors. Magnetic field levels depend primarily on the current, or load flowing on the line; as electricity demand increase and the current on the line increases, the magnetic field levels associated with the line generally increase. The magnetic field encircles the wire and the direction of the magnetic field is dependent upon the direction of current flow.

Similar to the electric field, magnetic field strengths decrease with the inverse square of the distance away from the power line. Unlike electric fields that vary little over time, magnetic fields are not constant over time because the current on any power line changes in response to increasing and decreasing electrical load. Magnetic fields are not easily shielded.

4.16.2.5 Electric and Magnetic Field Calculations

Electric and magnetic fields from the transmission line alternative routes were calculated at the edge of ROW and within the ROW. The EMF analysis was performed using the Bonneville Power Administration (BPA) Corona and Field Effects Program software on the various transmission line structure and conductor configurations.

EMF levels were calculated at a height of one meter above ground with phase conductors located at minimum conductor heights. The minimum ground clearances used for the proposed Vantage-Pomona Heights 230 kV line, Union Gap-Midway 230 kV line and the Midway-Moxee 115 kV line was 27 feet. The minimum ground clearance for the BPA Hanford-Vantage 500 kV line was 35 feet. These ground clearances are based on maximum sag conditions under maximum operating temperatures of conductors.

The Vantage-Pomona Heights line was modeled using the following characteristics for all cases:

- Single conductor per phase 1,272 kilo-circular mils (kcmil) aluminum conductor steel-reinforced cable Bittern
- 326 Amps of balanced current
- Maximum operating voltage of 247 kV

There are five cases that were investigated for different structure types and areas where the proposed transmission line may parallel existing transmission lines. The cases that were modeled are described below.

Case I
Case I is a single circuit H-frame structure. The proposed structure would have a ROW width of 125 feet. Refer to Figure 4.16-1 for a drawing of this structure configuration.

Case II
Case II is single circuit single pole structure. The proposed structure would have a ROW width of 75 feet. Refer to Figure 4.16-2 for a drawing of this structure configuration.

Case III
Case III is a single circuit single pole with 12 kV underbuild. The proposed structure would have a ROW width of 75 feet. Refer to Figure 4.16-3 for a drawing of this structure configuration.

Case IV
Case IV is a single circuit H-frame structure with the 230 kV transmission line paralleling the BPA Midway-Moxee 115 kV line and the Pacific Power Union Gap – Midway 230 kV line. Both the BPA 115 kV structures and the Pacific Power 230 kV structures are H-frame structures. The total ROW width would be 317.5 feet. Refer to Figure 4.16-4 for a drawing of the configuration of the structures.

Case V
Case V is a single circuit H-frame structure with the line paralleling the BPA Hanford-Vantage 500 kV line. The BPA 500 kV structure is horizontal steel lattice. The total ROW width would be 325 feet. Refer to Figure 4.16-5 for a drawing of the configuration of the structures.

The maximum EMF values in the ROW and at the edge of the ROW for the proposed 230 kV transmission line are provided for the five cases calculated at the minimum conductor clearance over the estimated ruling span for each case.

The maximum field values would be present only at locations directly under the line, near mid-span, where the conductors are at the minimum clearance. The conditions of minimum conductor clearance at maximum current and maximum voltage occur very infrequently. The calculated maximum EMF levels are rarely reached under real life conditions due to the following:

- The actual line height is generally above the minimum value used in the computer model.
- The actual voltage is below the maximum value used in the model.
- Vegetation within and near the edge of the ROW tends to shield the field at ground level.

Maximum electric fields on existing 230 kV corridors are typically 2.5 to 3.0 kV/m. On 500 kV transmission line corridors, the maximum electric fields range from 7.0 to 9.0 kV/m.

Calculated Values of Electric Fields

Table 4.16-10 presents the electric field results for the various configurations.

TABLE 4.16-10 ELECTRIC FIELD RESULTS FOR VARIOUS CONFIGURATIONS (KV/M)

CASE	ROW WIDTH (FEET)	LEFT EDGE OF ROW	RIGHT EDGE OF ROW	MAXIMUM
I	125	0.935	0.935	3.452
II	75	0.910	0.930	2.745
III	75	0.568	0.500	0.674
IV	317.5	0.790	0.923	3.667
V	325	2.45	1.84	3.53

Case I
Figure 4.16-1 is a horizontal profile plot of the electric field levels for Case I. The maximum electric field level inside the ROW is 3.45 kV/m and the maximum electric field at the edge of ROW is 0.935 kV/m.

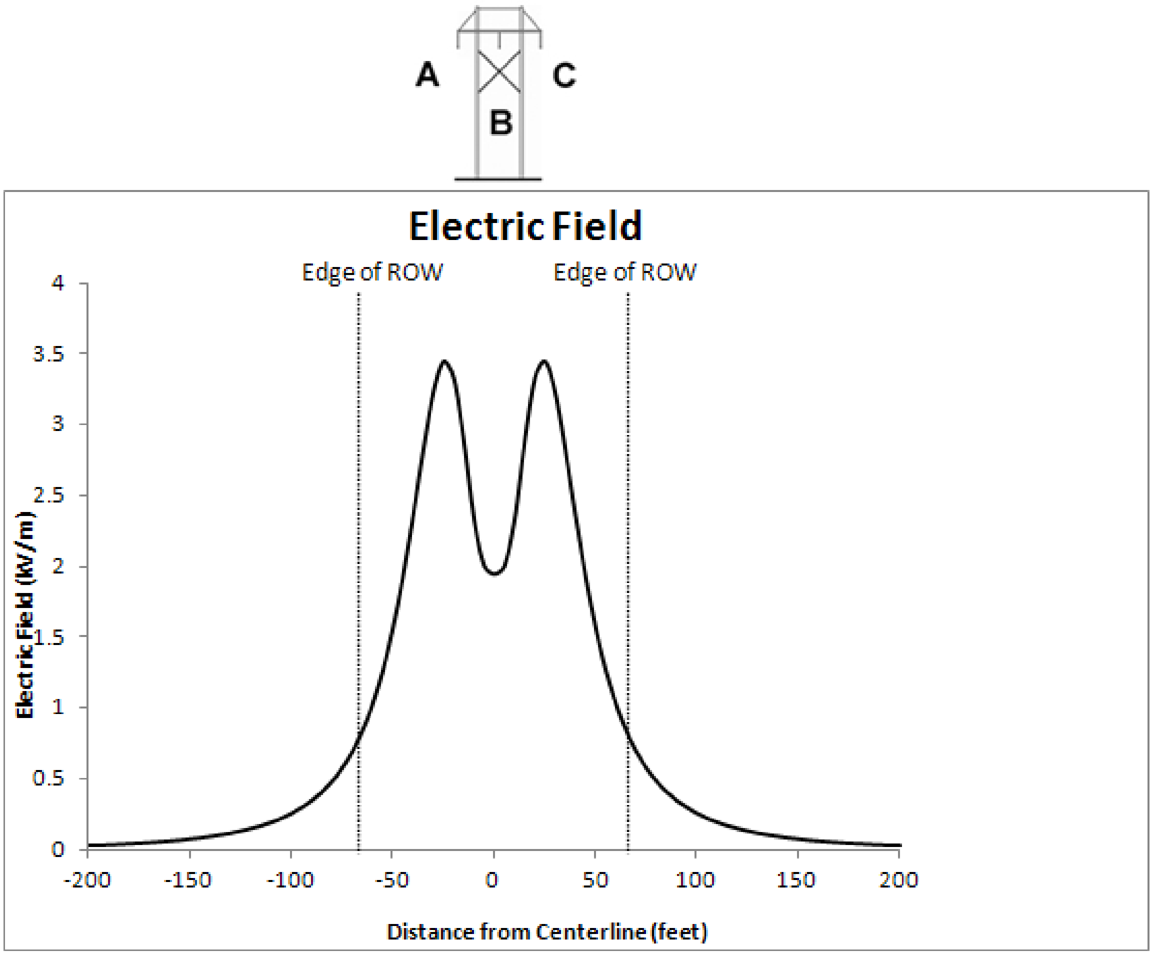

FIGURE 4.16-1 CASE I: H-FRAME HORIZONTAL CIRCUIT-ELECTRIC FIELD

Case II
Figure 4.16-2 is a horizontal profile plot of the electric field levels for Case II. The maximum electric field level inside the ROW is 2.75 kV/m and the maximum electric field at the edge of ROW is 0.93 kV/m.

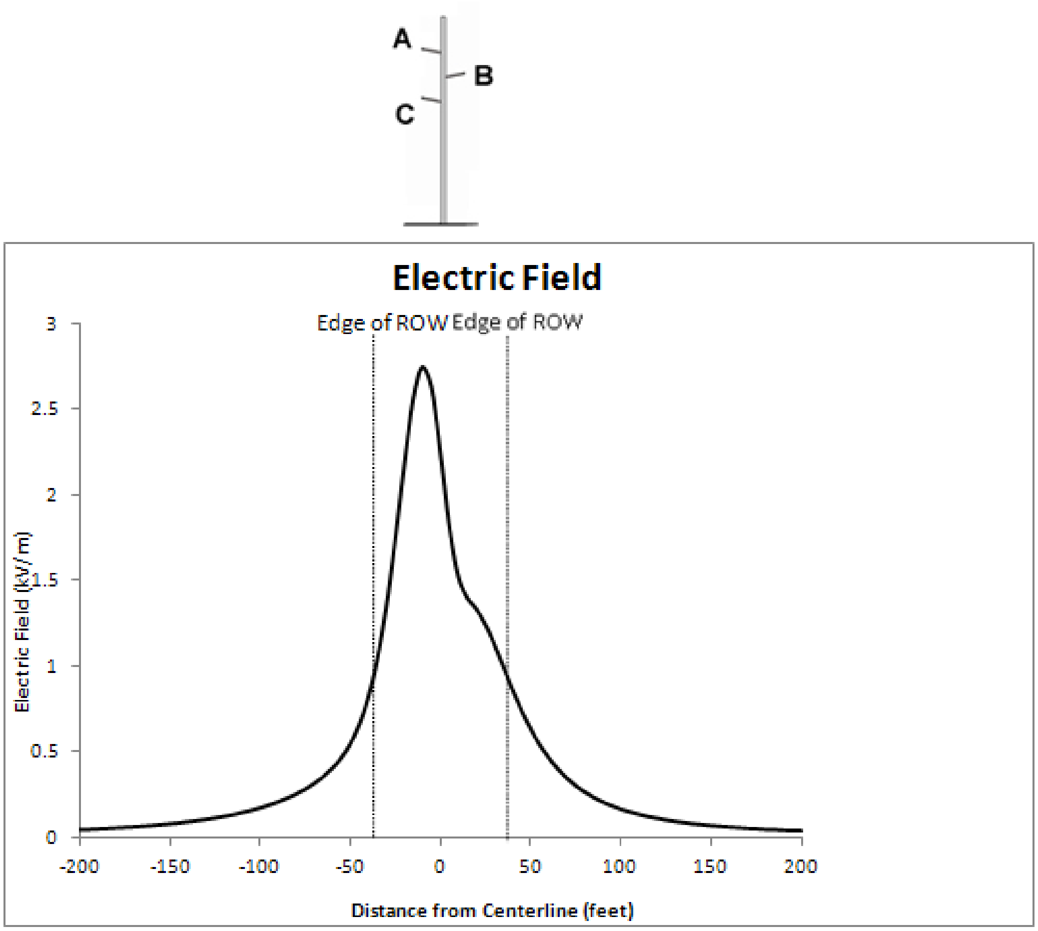

FIGURE 4.16-2 CASE II: SINGLE POLE VERTICAL CIRCUIT-ELECTRIC FIELD

Case III

Figure 4.16-3 is a horizontal profile plot of the electric field levels for Case III. The maximum electric field level inside the ROW is 0.67 kV/m and the maximum electric field at the edge of ROW is 0.57 kV/m.

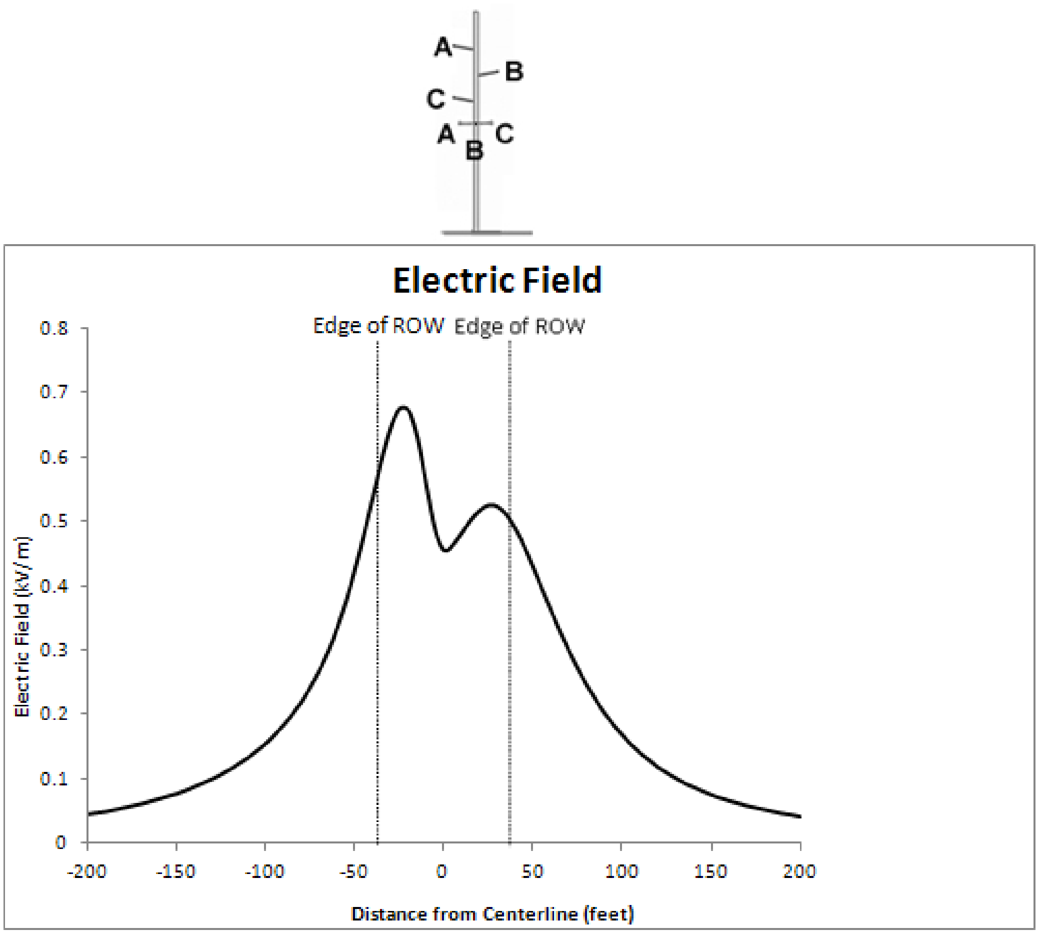

FIGURE 4.16-3 CASE III: SINGLE POLE WITH 12 KV UNDERBUILD-ELECTRIC FIELD

Case IV

Figure 4.16-4 is a horizontal profile plot of the electric field levels for Case IV. The maximum electric field level inside the ROW is 3.67 kV/m and the maximum electric field at the edge of ROW is 0.92 kV/m.

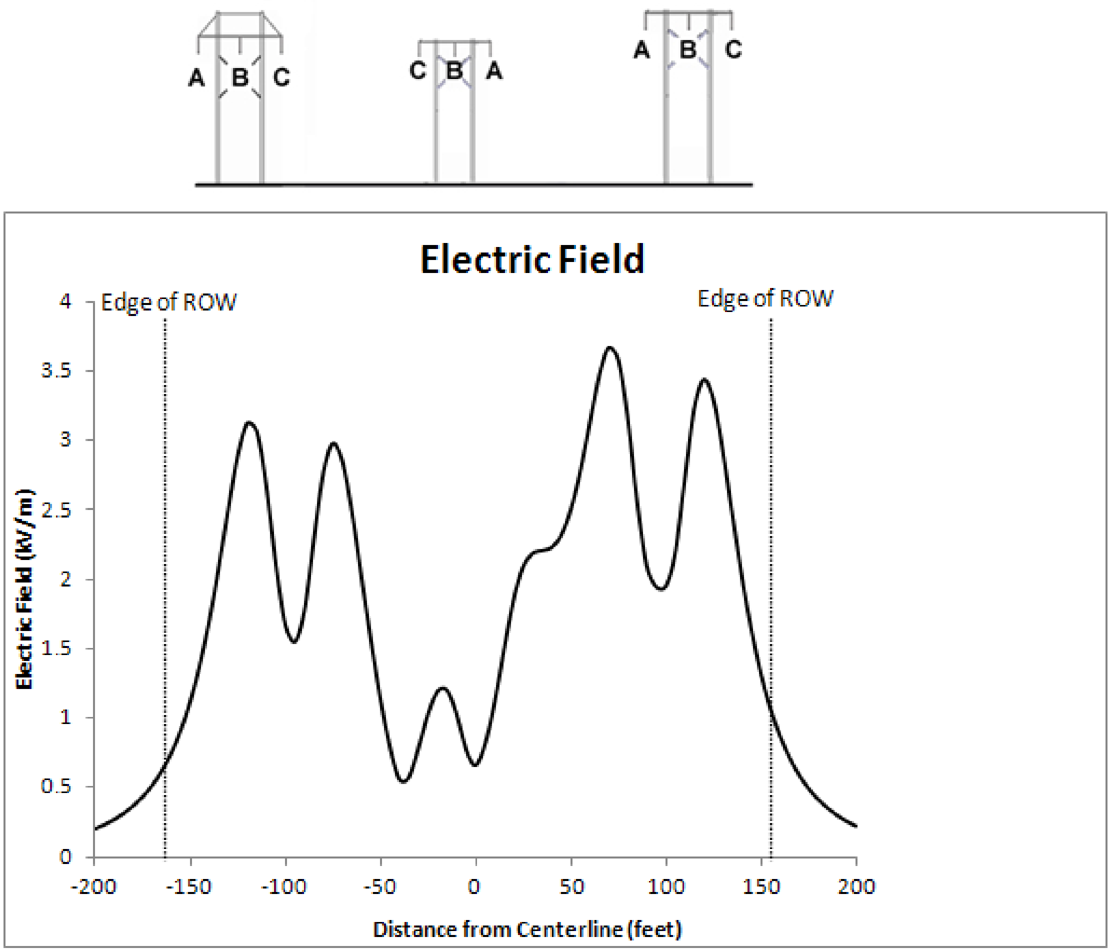

FIGURE 4.16-4 CASE IV: H-FRAME PARALLEL TO UNION GAP-MIDWAY 230 KV AND MIDWAY-MOXEE 115 KV-ELECTRIC FIELD

Case V

Figure 4.16-5 is a horizontal profile plot of the electric field levels for Case V. The maximum electric field level inside the ROW is 3.53 kV/m and the maximum electric field at the edge of ROW is 1.84 kV/m.

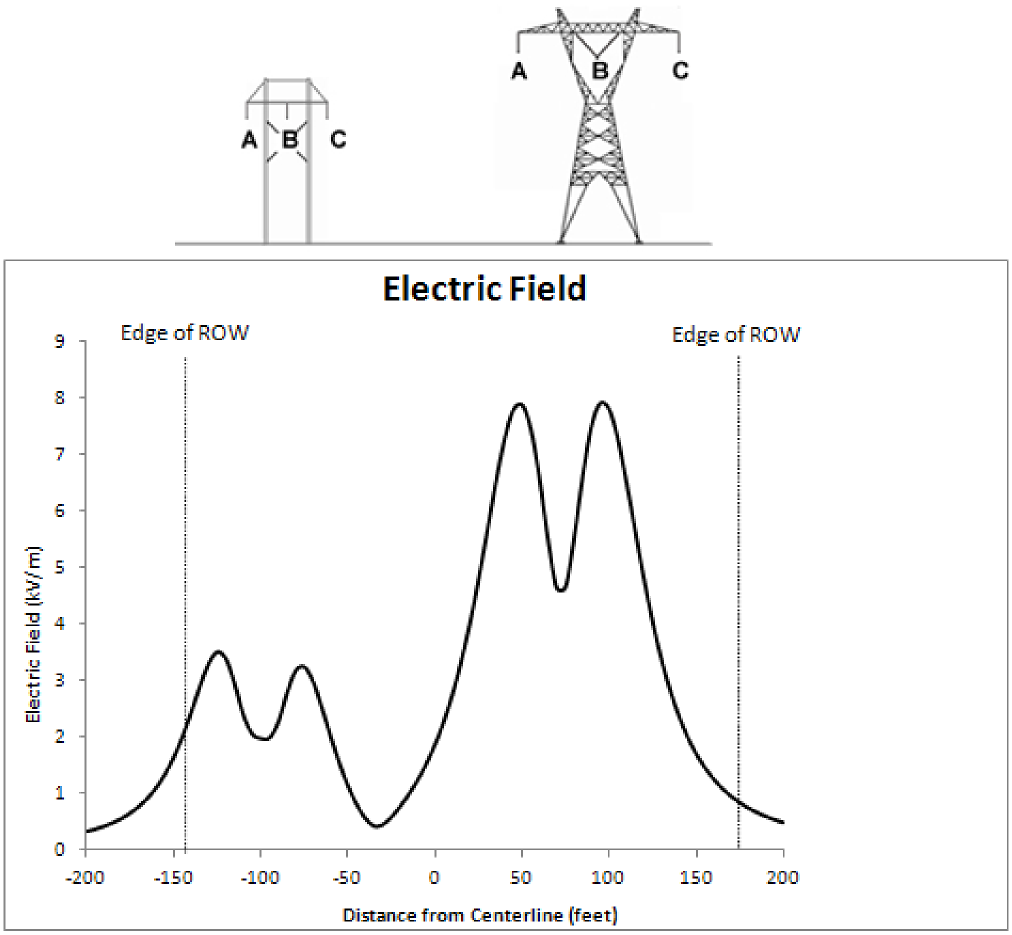

FIGURE 4.16-5 CASE V: H-FRAME PARALLEL TO BPA HANFORD-VANTAGE 500 KV - ELECTRIC FIELD

The electric fields from the proposed transmission line would meet the ACGIH (American Conference of Governmental Industrial Hygienists), ICNIRP, and Institute of Electrical and Electronics Engineers (IEEE) standards, provided wearers of pacemakers and similar medical-assist devices are discouraged from unshielded ROW use (a passenger in an automobile under the line would be shielded from the electric field). The estimated electric fields at the edge of the ROW for the proposed 230 kV line for all cases modeled would meet the limits of all states (see Table 4.16-2) except the state of Montana for Case V. There are no guidelines for the state of Washington for maximum or edge-of-ROW electric fields values.

Calculated Values of Magnetic Fields

Table 4.16-11 presents the calculated values of the magnetic field at 3.28 feet (one meter) height for proposed Vantage – Pomona 230 kV transmission line. Field values within the ROW and at the edge of the ROW of the 230 kV line are given for projected maximum currents and for minimum conductor clearances. The magnetic field levels and plots for the five cases are presented below.

TABLE 4.16-11 EXISTING MAGNETIC FIELD RESULTS – 100 PERCENT LOADING (MG)

CASE	ROW WIDTH (FEET)	LEFT EDGE OF ROW	RIGHT EDGE OF ROW	MAXIMUM
I	125	17.96	17.96	77.06
II	75	17.31	13.92	39.64
III	75	8.76	8.24	12.44
IV	317.5	71.4	12.20	96.6
V	325	53.5	97.4	67.9

Case I

Figure 4.16-6 is a horizontal profile plot of the magnetic field levels for Case 1. The maximum magnetic field level inside the ROW is 77.06 mG and the maximum magnetic field at the edge of ROW is 17.96 mG.

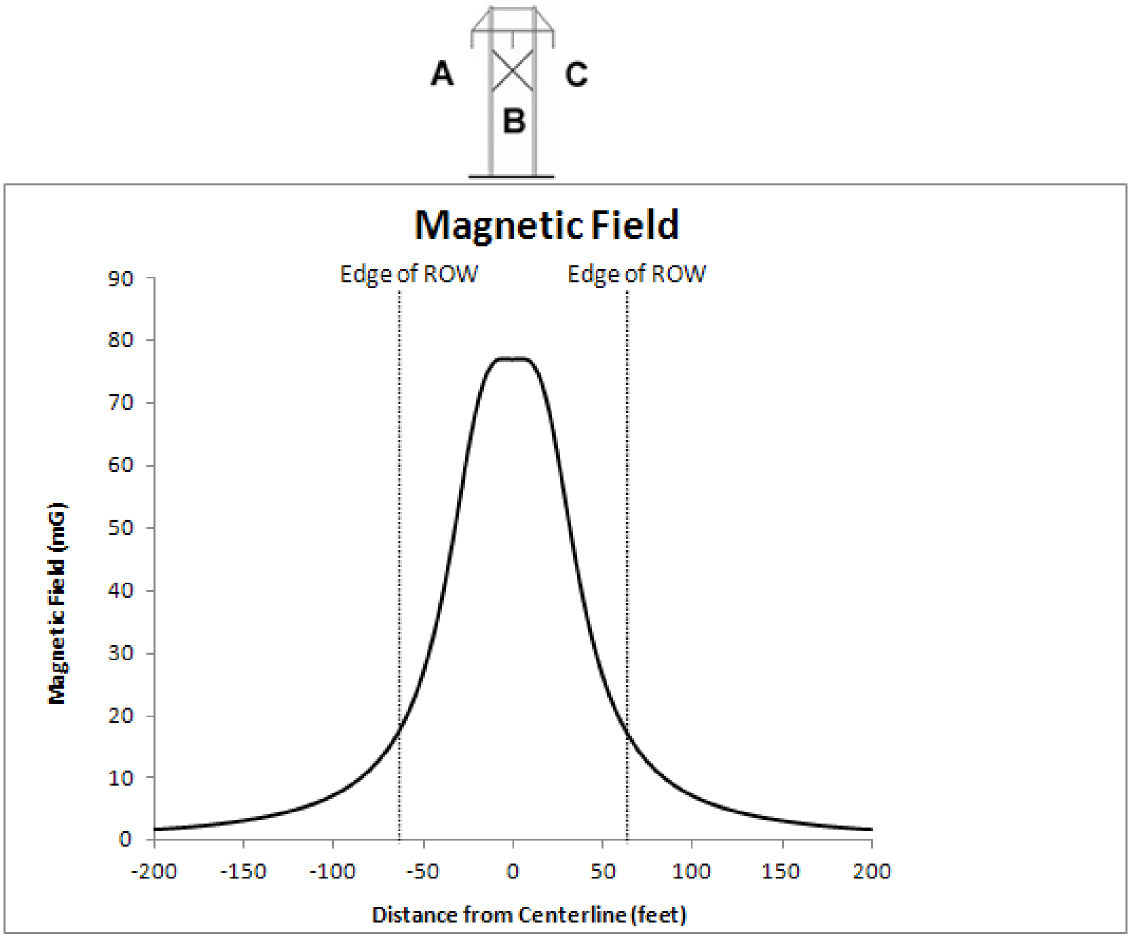

FIGURE 4.16-6 CASE I: H-FRAME HORIZONTAL CIRCUIT-MAGNETIC FIELD

Case II
Figure 4.16-7 is a horizontal profile plot of the magnetic field levels for Case 2. The maximum magnetic field level inside the ROW is 39.64 mG and the maximum magnetic field at the edge of ROW is 17.31 mG.

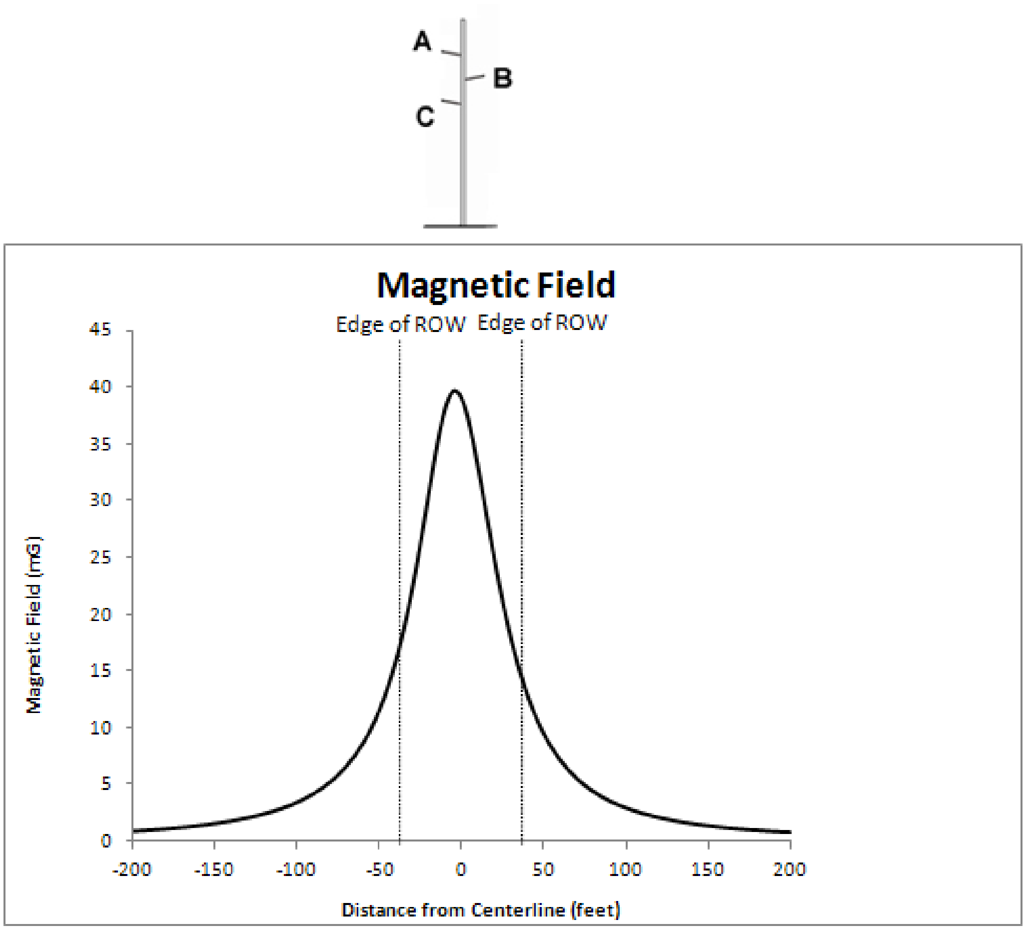

FIGURE 4.16-7 CASE II: SINGLE POLE VERTICAL CIRCUIT-MAGNETIC FIELD

Case III
Figure 4.16-8 is a horizontal profile plot of the magnetic field levels for Case 3. The maximum magnetic field level inside the ROW is 12.44 mG and the maximum magnetic field at the edge of ROW is 8.76 mG.

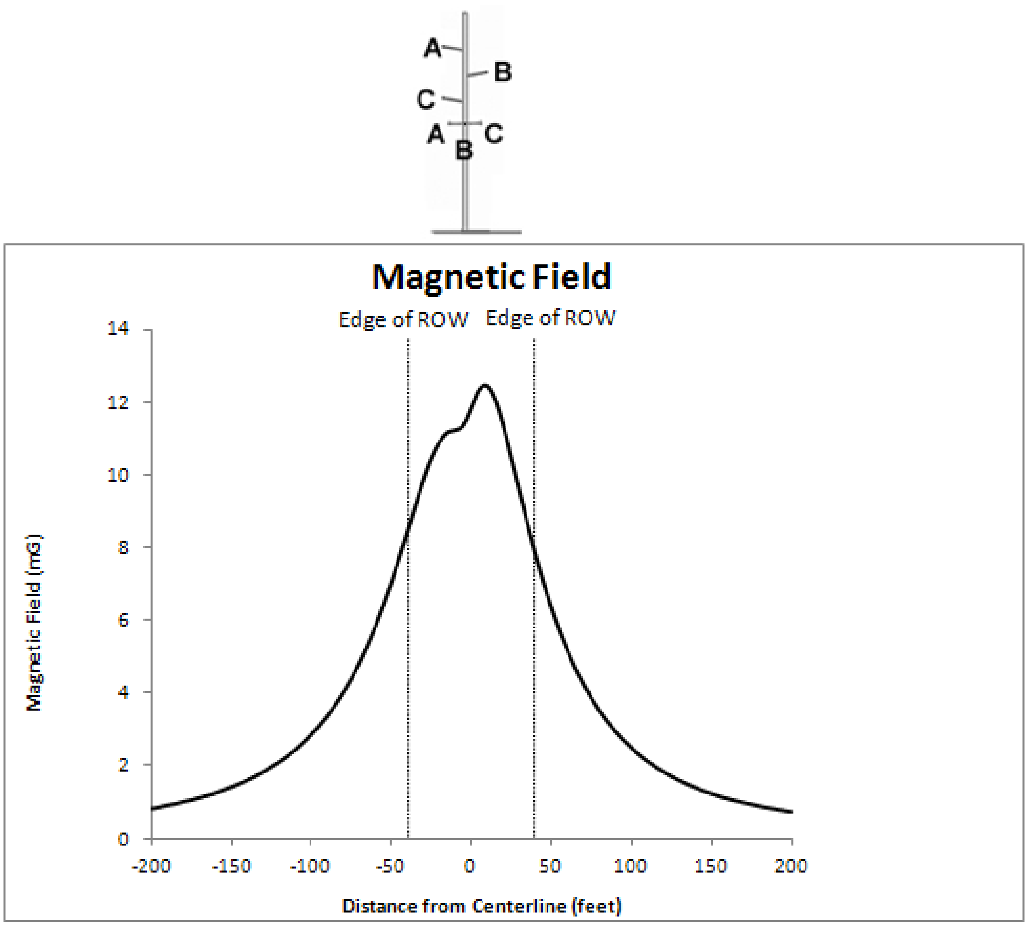

FIGURE 4.16-8 CASE III: SINGLE POLE WITH 12 KV UNDERBUILD-MAGNETIC FIELD

Case IV
Figure 4.16-9 is a horizontal profile plot of the magnetic field levels for Case 4. The maximum magnetic field level inside the ROW is 96.6 mG and the maximum magnetic field at the edge of ROW is 12.2 mG.

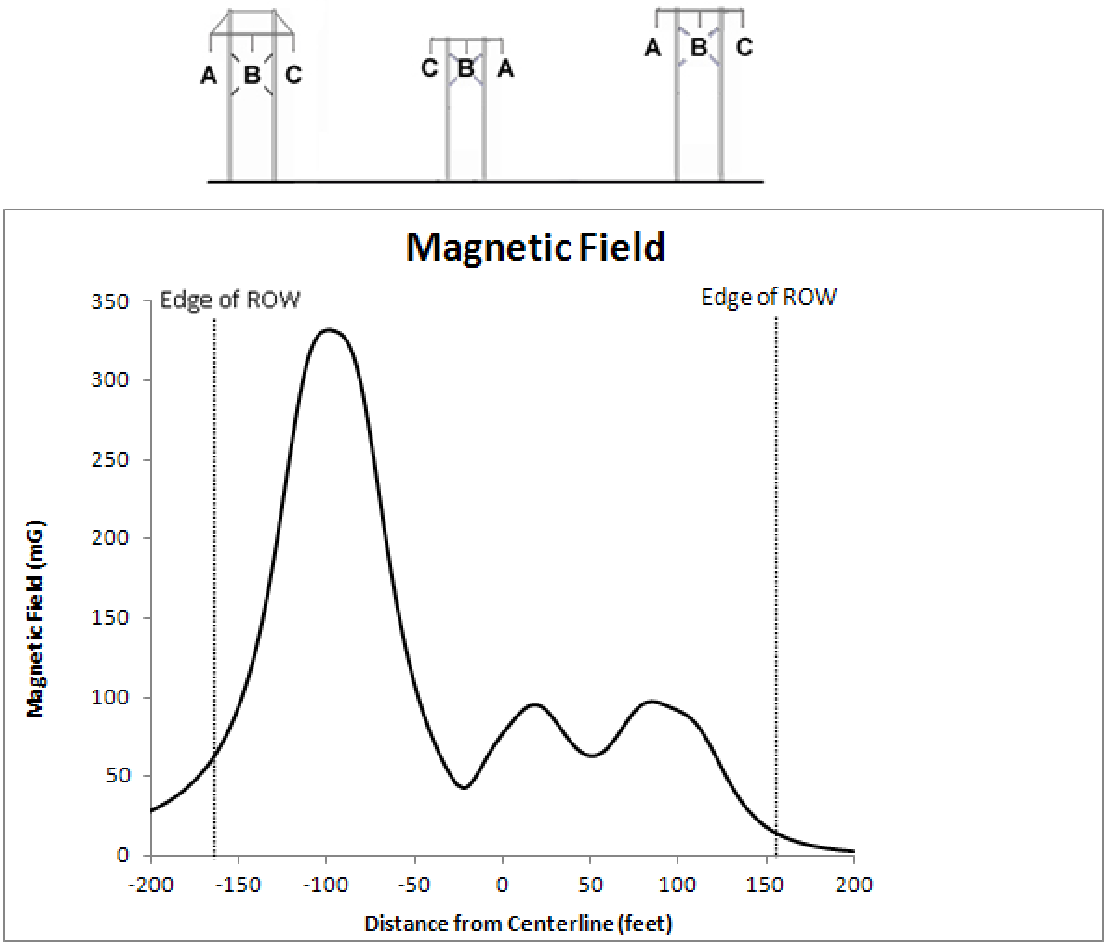

FIGURE 4.16-9 CASE IV: H-FRAME PARALLEL TO UNION GAP-MIDWAY 230KV AND MIDWAY-MOXEE 115 KV-MAGNETIC FIELD

Case V
Figure 4.16-10 is a horizontal profile plot of the electric field levels for Case 5. The maximum magnetic field level inside the ROW of the 230 kV transmission line is 67.9 mG and the maximum magnetic field at the edge of ROW of the 230 kV transmission line is 53.5 mG.

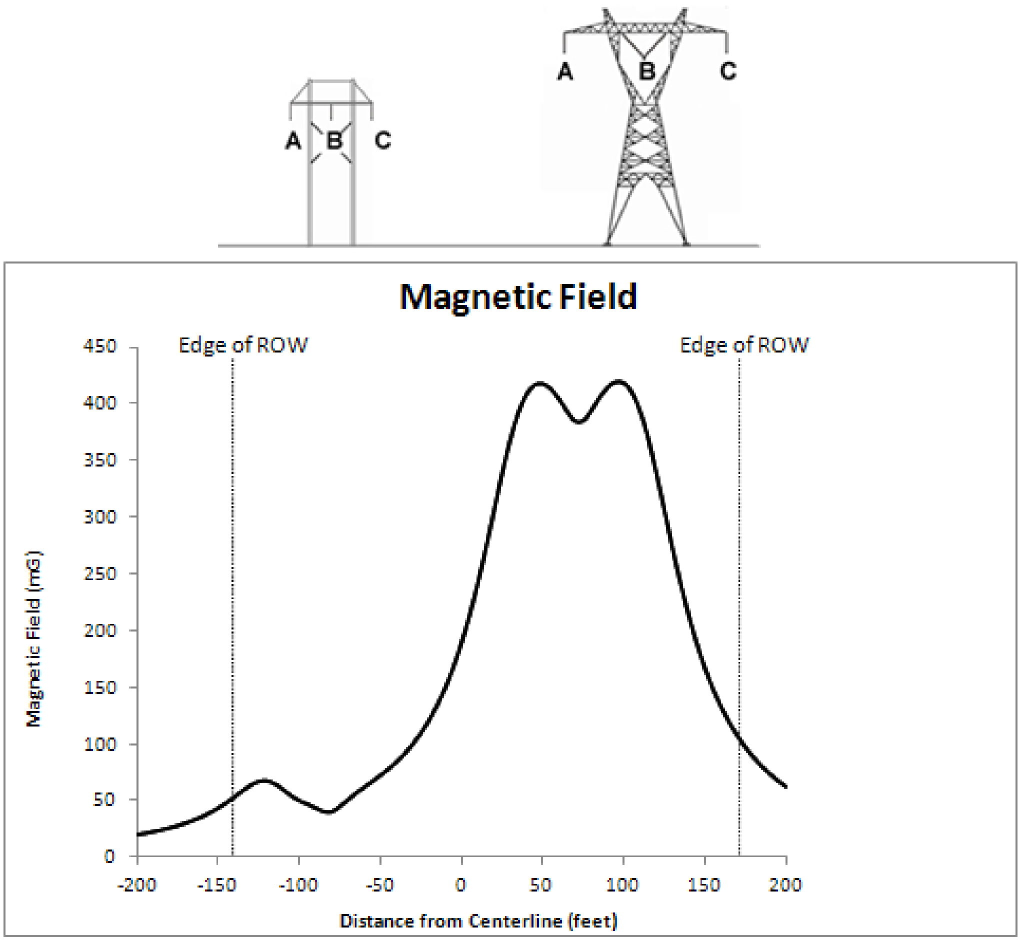

FIGURE 4.16-10 CASE V: H-FRAME PARALLEL TO BPA HANFORD-VANTAGE 500 KV-MAGNETIC FIELD

The magnetic fields from the proposed line would be within the regulatory limits of the two states (Florida and New York) that have established them and within guidelines for public exposure established by ICNIRP and IEEE. The state of Washington does not have limits for magnetic fields from transmission lines.

4.16.2.6 EMF Health and Ecological Effects Concerns

Health Concerns
For more than 30 years, questions have been asked about the potential effect of EMF from powerlines on people. Early studies focused on electric fields. Magnetic fields began receiving increased attention in the late 1970s. A substantial amount of research has been conducted in the United States and around the world over the past several decades examining whether exposures to power frequency EMF have health or environmental effects.

Epidemiology studies have addressed many of the issues raised about EMF and health. Multidisciplinary reviews express the consensus in the scientific community that the epidemiologic evidence is weak and insufficient to demonstrate a causal relationship between extremely low frequency (ELF; pertaining to power frequency) magnetic fields and adverse health effects. These reviews include those made the National Institute of Environmental Health Sciences (NIEHS 1998, 1999, 2002) National Academy of Sciences (NAS 1999), the Health Council of the Netherlands (HCN 2001; HCN 2004), the National Radiological Protection Board of Great Britain (NRPB 2004), World Health Organization (WHO 2007) and the International Agency for Research on Cancer (IARC 2002). The reviews agree that there is little evidence to suggest EMF is associated with adverse health effects, including most forms of adult and childhood cancer, heart disease, Alzheimer's disease, depression and reproductive effects. However, all of the assessments conclude that epidemiological studies in total suggest an association between magnetic fields at higher time-weighted average exposure levels (greater than 4.0 mG) and childhood leukemia. Nevertheless, all agree that the experimental laboratory data do not support a causal link between EMF and adverse health effects, including leukemia, and have not concluded that EMF is, in fact the cause of any disease. The conclusions of these multidisciplinary reviews are presented below.

National Institute of Environmental Health Sciences (NIEHS)

The NIEHS 1999 report (NIEHS 1999) concluded that:

"The scientific evidence suggesting that ELF EMF exposures pose any health risk is weak. The strongest evidence for health effects comes from associations observed in human populations with two forms of cancer: childhood leukemia and chronic lymphocytic leukemia in occupationally exposed adults. While the support from individual studies is weak, the epidemiological studies demonstrate, for some methods of measuring exposure, a fairly consistent pattern of a small, increase risk with increasing exposure that is somewhat weaker for chronic lymphocytic leukemia than childhood leukemia. In contrast the mechanistic studies and the animal toxicology literature fail to demonstrate any consistent pattern across studies although sporadic findings of biological effects have been reported. No indication of increased leukemia in experimental animals has been observed."

"The lack of connection between the human data and the experimental data (animal and mechanistic) severely complicates the interpretation of these results. The human data are in the right species and tied to real life exposures and shoe some consistency that is difficult to ignore. This assessment is tempered by the observation that given the weak magnitude of these increased risks, some other factor of common source of error could explain these findings. However, no consistent explanation other than exposure to ELF EMF has been identified."

"Epidemiological studies have serious limitation in their ability to demonstrate a cause and effect relationship whereas, laboratory studies, by design, can clearly show cause and effect are possible. Virtually all of the laboratory evidence in animals and humans, and most of the mechanistic work in cells fails to support a causal relationship between exposure to ELF EMF at environmental levels and changes in biologic function or disease status. The lack of consistent, positive findings in animal or mechanistic studies weakens the belief that this association is actually due to ELF EMF, but it cannot completely discount the epidemiological findings."

The NIEHS concludes the ELF EMF exposure cannot be recognized at this time as entirely safe because of the weak scientific evidence that exposure may pose a leukemia hazard. The conclusion of this report is insufficient to warrant aggressive regulatory concern. However, because virtually everyone in the United States uses electricity and therefore is routinely exposed the ELF EMF, passive regulatory action is warranted such as continued emphasis on educating both the public and the regulated community on means aimed at reducing exposures. The NIEHS does not believe that other cancers or noncancer health outcomes provide sufficient evidence of a risk to currently warrant concern.

The NIEHS 2002 report (NIEHS 2002) concluded that:

"For most health outcomes, there is no evidence that EMF exposures have adverse effects. There is some evidence from epidemiology studies that exposure to power-frequency EMF is associated with an increased risk for childhood leukemia. This association is difficult to interpret in the absence of reproducible laboratory evidence or a scientific explanation that links magnetic fields with childhood leukemia."

World Health Organization (WHO 2007)

In October 2005, WHO convened a task group of scientific experts to assess any risks to health that might exist from exposure to ELF EMF in the frequency range >0 to 100,000 Hz (100 kHz). While the IARC examined the evidence regarding cancer in 2002, this task group reviewed evidence for a number of health effects and updated the evidence regarding cancer. The conclusions and recommendations of the task group are presented in a WHO Environmental Health Criteria monograph (WHO 2007). Following a standard health risk assessment process, the WHO task group concluded that no substantive health issues are related to ELF EMF at levels generally encountered by members of the public.

National Academy of Sciences (NAS 1999)

"An earlier Research Council assessment of the available body of information on biologic effects of power-frequency magnetic fields led to the conclusion the current body of evidence does not show that exposure to these fields presents a human health hazard. Specifically, no conclusive and consistent evidence shows that exposure to residential electric and magnetic fields produces cancer, adverse neurobehavioral effects, or reproductive and developmental effects. The new largely unpublished contributions of the EMF- RAPID program are consistent with that conclusion. We conclude that no finding from the EMF-RAPID program alters the conclusions on the previous review on the Possible Effects of Electromagnetic Fields on Biologic Systems (National Research Council 1997). In view of the negative outcomes of EMF-RAPID replication studies, it now appears even less likely that magnetic fields in the normal domestic or occupational environment produce important health effects, including cancer."

National Radiological Protection Board of Great Britain (NRPB 2001, 2004)

"Laboratory experiments have provided no good evidence that extremely low frequency (ELF) electromagnetic fields are capable of producing cancer, nor do human epidemiological studies suggest that they cause cancer in general. There is, however, some epidemiological evidence that prolonged exposure to higher levels of power frequency magnetic fields is associated with a small risk of leukemia in children. In practice, such levels of exposure are seldom encountered by the general public in the UK [or in the US]."

"Because of the uncertainty…and in absence of a dose response relationship, NRPB has concluded that the date concerning childhood leukemia cannot be used to derive quantitative guidance on restricting exposure."

Health Council of the Netherlands (HCN 2004)

"Because the association is only weak and without a reasonable biological explanation, it is not unlikely that it [an association between ELF exposure and childhood leukemia] could also be explained by chance…The Committee therefore sees no reason to modify its earlier conclusion that the association is not likely to be indicative of a causal relationship."

"The Committee, like the IARC itself, points out that there is no evidence to support the existence of a causal relationship here. Nor has research yet uncovered any evidence that a causal relationship might exist."

International Agency for Research on Cancer (IARC 2002)

"Studies in experimental animals have not shown consistent carcinogenic or co-carcinogenic effects or exposures to ELF magnetic fields, and no scientific explanation has been established for the observed association of increased childhood leukemia risk with increasing residential ELF magnetic field exposure" IARC categorized EMF as a "possible carcinogen" for exposures at high levels, based on the meta-analysis of studies of statistical links with childhood leukemia at levels above 3-4 mG.

Ecological Effects

The exposure of animals to electric and magnetic fields has also been investigated for over 30 years. Vegetation in the form of grasses, shrubs, and small trees largely shields small ground-dwelling species such as mice, rabbits, foxes, and snakes from electric fields. Species that live underground, such as moles, woodchucks, and worms, are further shielded from electric fields by the soil; aquatic species are shielded from electric fields by water. Large species such as deer and domestic livestock have greater potential exposures to electric fields since they can stand taller than the surrounding vegetation. However, the duration of exposure for deer and other large animals is limited to foraging bouts or the time it takes them to cross under the line. All species would be exposed to higher magnetic fields under or near a transmission line than elsewhere, because vegetation and soil do not provide shielding from this aspect of the transmission-line electrical environment.

Field studies have been performed to monitor the behavior of large mammals in the vicinity of high-voltage transmission lines. No effects of electric or magnetic fields were evident in two studies from the northern U.S. on big game species, such as deer and elk, exposed to a 500 kV transmission line (Goodwin 1975; Picton et al. 1985).

Much larger populations of animals that might spend time near a transmission line are livestock that graze under or near transmission lines. To provide a more sensitive and reliable test for adverse effects than informal observation, scientists have studied animals continuously exposed to fields from high-voltage lines in relatively controlled conditions. For example, grazing animals such as cows and sheep have been exposed to high-voltage transmission lines and their reproductive performance examined (Lee et al. 1996). No adverse effects were found among cattle exposed to a 500 kV direct-current overhead transmission line over one or more successive breeding events (Angell et al. 1990). Compared to unexposed animals in a similar environment, the exposure to 50 Hz fields did not affect reproductive functions or pregnancy of cows (Algers and Hennichs 1985; Algers and Hultgren 1987). Sheep and cattle exposed to EMF from transmission lines exceeding 500 kV were examined and no effect was found on the levels of hormones in the blood, weight gain, onset of puberty, or behavior (Stormshak et al. 1992; Lee et al. 1993; Lee et al. 1995; Thompson et al. 1995; Burchard et al. 1998; Burchard et al. 2004).

Greenberg et al. (1981) studied honeybee colonies placed near 765 kV transmission lines. They found that hives exposed to AC electric fields of 7.0 kV/m had decreased hive weight, abnormal amounts of propolis (a resinous material) at hive entrances, increased mortality and irritability, loss of the queen in some hives, and a decrease in the hive's overall survival compared to hives that were not exposed. Placing the hive farther from the line, shielding the hive, or using hives without metallic parts eliminates this problem.

Numerous studies have been carried out to assess the effect of exposure of plants to transmission-line electric and magnetic fields. These studies have involved both forest species and agriculture crops. Researchers have found no adverse effects on plant responses, including seed germination, seedling emergence, seedling growth, leaf area per plant, flowering, seed production, germination of the seeds, longevity, and biomass production (Lee et al. 1996).

4.16.3 Audible and Radio Noise

Corona and radio noise occur when the 60 Hz electric fields at the surface of power line conductors are large enough to cause a local breakdown in the insulating properties of the air. This electrical breakdown of the air or ionization of the air, at the surface of the conductor is called corona. Corona is a small "spark" or electrical breakdown in the air surrounding the conductor. This small "spark" into the air produces audible and radio noise. If there is sufficient corona activity, audible noise and radio/television noise can be noticeable within a few hundred feet of the transmission line, and small amounts of ozone and nitrous oxide can be released. These effects are most pronounced directly underneath the line conductors, and decrease with distance from the transmission line. Other audible noise would occur as a result of construction activities.

4.16.3.1 Affected Environment

The Project area acoustical setting generally has relatively low ambient noise levels due to its rural setting. Higher noise levels occur primarily near highway crossings and in agricultural areas. Additional noise is also created by military operations occasionally occurring at the Joint Base Lewis-McChord Yakima Training Center (JBLM-YTC), and noise levels are somewhat higher near the U.S. Interstate 82 corridor and the more urbanized area of Yakima and Selah. Higher noise levels also occur in motorized recreational areas in the Saddle Mountains Management (off-highway vehicle [OHV]) Area and Beverly Sand Dunes OHV Park. Overall, the Project area typically ranges from very quiet with natural sounds such as birds, insects, and wind dominating to noisy in localized areas during periods of off-road recreational use, agricultural operations, shooting, and other outdoor activities generating isolated and periodic peaks of higher levels.

4.16.3.2 Corona Noise

Corona activity depends on a number of factors such as altitude, line voltage, conductor size, conductor geometry, and weather conditions. The breakdown strength of air is 30 kV per centimeter at sea level and decreases with increasing altitude. For a particular altitude, conductor size and line voltage are taken into consideration when designing a transmission line so that the electric fields at the conductor surface do not exceed the breakdown potential of air. However, for lines with a voltage equal to or greater than typically 345 kV, any irregularities on the conductor surface (e.g., nicks, water droplets, or debris) may create points where the electric field is intensified sufficiently to produce corona. In inclement weather, moisture such as raindrops or snowflakes accumulating on the conductor surface would also act as points for corona inception. Corona activity is, therefore, most likely to occur on high-voltage transmission lines at higher altitudes during inclement weather if it occurs. High-voltage transmission lines are designed to avoid corona levels that would be likely to cause electronic or audible interference. These factors can be addressed and mitigated if necessary through design choices for the transmission line such as conductor size and bundling as well as general geometry of the transmission.

The air breakdown, or small spark caused by corona at the surface of a transmission line conductor, is accompanied by a snapping sound. If there is sufficient corona activity on a high-voltage line, many small snaps from corona sources along a conductor may be sufficient, in combination, to produce discernible audible noise or crackle at the edge of the ROW. At lower system voltages (voltages below 230 kV), audible noise from the transmission-line conductors is typically not formally evaluated because of the very low levels of corona activity and correspondingly low occurrence of corona effects. For lines at higher voltages (345 kV and above) with higher conductor-surface gradients, corona activity is more likely and audible noise more frequent, particularly in inclement weather, and is therefore taken into account in the design of the transmission line.

Sound intensity is measured in decibels referenced to 20 micropascals, which is approximately the pressure threshold of human hearing at one kilohertz (kHz). The range of audible frequencies for the human ear is from approximately 20 Hz to 20 kHz, with peak sensitivity near 1.0 kHz. The change in sensitivity of the human ear with frequency is reflected in measurements by weighting the contribution of sound at different frequencies. The weighting of sound over the frequency spectrum to account for the sensitivity of the human ear is called the A-weighted sound level. When the A-weighting scale is applied to a sound-pressure measurement, the level is often reported as dBA.

The sound intensity of typical human speech is approximately 60 to 70 dBA, and background levels of noise in rural environments are about 30 to 40 dBA. Specific identifiable noises such as birdcalls, neighborhood activity, and traffic can produce background audible noise levels of 40 to 70 dBA or higher (Industrial Noise Control, Inc. 2010).

Audible noise levels from the transmission line itself would not occur until the line is energized. During construction audible noise related to the line would consist of construction noise and be limited to localized areas that have active construction activities. Once the lines are energized, the AC audible noise would vary depending on the weather conditions, with foul weather producing increased levels of audible noise. Little or no audible noise is contributed by 230 kV transmission lines in fair weather, although their audible noise may increase in foul weather (up to 60 dBA); however, it is less than or similar to the audible noise produced by rain and wind (up to 60 dBA, depending on rainfall rate and wind velocity; Industrial Noise Control, Inc 2010).

4.16.3.3 Construction Noise

Construction noise can be created from on-site and off-site sources. On-site noise sources would principally consist of the operation of heavy-duty diesel and gasoline-powered construction equipment. Off-site noise sources would include vehicles commuting to and from the job site, as well as from trucks transporting material to the staging areas or construction ROW. These sources are described below. Construction of the transmission line and substation expansion areas would generate temporary noise that could affect nearby residences and recreationists. Daytime construction activities are excluded from EPA, state and county noise regulations.

Transmission line construction would occur as a series of sequential events distributed over several miles along the Project route at any one time. Construction of the Project transmission lines will be completed in nine stages (see Section 2.4.3): the centerline of transmission line will be surveyed and staked, access roads identified, staked and constructed where necessary, ROW and structure sites will be cleared, work areas and set-up sites will be cleared as needed, materials will be distributed along centerline, holes will be dug for transmission line structures, structures will be framed and erected, conductors and ground wires will be installed, and construction sites will be cleaned-up and reclaimed.

The Project construction phase would produce noise as heavy equipment would be required to build the proposed transmission line routes. Short-term use of equipment such as backhoes, cranes, front-end loaders, bulldozers, graders, excavators, compressors, generators, and various trucks would be needed for mobilizing crew, transporting and use of materials, line work, and site clearing and preparation. Spur roads and access roads would require use of earthmoving equipment such as bulldozers and graders.

Construction noise is usually made up of intermittent peaks and continuous lower levels of noise from equipment cycling through use. Noise levels associated with ground equipment would generally range between 65 to 93 dBA, with helicopter noise peaking at about 100 dBA. Table 4.16-12 summarizes maximum noise levels produced by such equipment at 50 feet. Sound dampening would occur at greater distances, and is a function of frequency, temperature, and humidity.

On-site construction noise would occur primarily from heavy-duty construction equipment, including helicopters. It is estimated that heavy-duty construction equipment such as graders and trucks would be on-site along the transmission line alignment for approximately twelve months, during which construction activities would mostly involve material delivery, road grading, and direct imbed pole auguring and blasting in bedrock (when needed). For the Columbia River crossing structures, additional activities generating noise would include foundation installation, assembling and installing the lattice structures, clipping in the conductor, and restoring the ROW. Activities in any specific area would be short term as activities progressed along the ROW.

TABLE 4.16-12 CONSTRUCTION EQUIPMENT NOISE LEVELS

Type of Equipment	Maximum dBA[1] at 50 Feet
Earth Moving	
Front Loaders	66-93
Backhoes	72-92
Tractors, Dozers	68-93
Scrapers, Graders	72-92
Trucks	65-92
Rollers	66-83
Material Handling	
Concrete Mixers	67-86
Concrete Pumps	68-81
Cranes (movable)	70-92
Cranes (derrick)	80-83
Forklifts	76-82
Tensioners	76-86
Cable Pullers	74-81
Pneumatic Tools	
Pneumatic Wrenches	84-88
Jack Hammers and Rock Drills	72-93
Compactors	80-83
Helicopters	90-100

[1] Decibels (A weighted)

Noise would also be generated along the Project route, access roads, structure sites, pull sites, staging and maintenance areas, helicopter fly yards, and substation sites. Additional noise sources may include commuting workers, and trucks and helicopters moving material to and from the work sites. The noise impacts at NSAs from construction would depend on the type of equipment used, the mode of operation of the equipment, the length of time the equipment is in use, the amount of equipment used simultaneously, and the distance between the sound source and NSA. Two types of noise are associated with on-site construction activities: intermittent and continuous. When determining noise levels, an L_{eq} is generally accepted as the average sound level. Noise levels would vary for different construction tasks and type of equipment used.

Off-site noise during construction would occur primarily from commuting workers and from various truck trips to and from the construction sites. The means for bringing personnel, materials, and equipment to each structure site would vary along the route alignment. It is also assumed that truck trips would be required to haul structures, conductor line, and other materials to the construction sites. The peak noise levels (approximately 70 to 75 dB(A) at 50 feet) associated with passing trucks and commuting worker vehicles would be short-term in duration (see Table 4.16-11).

Blasting could be required in rocky areas where augering is not possible due to underlaying geological and soil conditions. This would most likely occur along the Columbia River, along the Umtanum Ridge, and in the Saddle Mountains. Where blasting might occur, the explosion would produce a short noise like a thunderclap that could be audible for half a mile or more.

Helicopters would be used in specific areas as necessary, such as in areas of difficult accessibility due to terrain, In particular, helicopters would be used in areas where access is limited or where there are environmental constraints to accessing the Project area with standard construction vehicles or equipment. Project activities that would be facilitated by helicopters include equipment and materials to structure sites, structure placement (except tubular steel poles), hardware installation, and wire stringing operations.

At any one location along the Proposed Route and Route Alternatives, helicopter operations would occur for short periods several times per day. Therefore, the USDOT 90 dBA one-hour Leq (1h) is the most appropriate criteria to assess the potential for adverse noise impacts. Operations would be limited to daytime working hours only and would be fairly short-term in nature. Therefore, short-term construction noise impacts from helicopter operations would be minor.

Helicopters generally fly at low altitudes; therefore, potential temporary increases to ambient sound levels would occur in the area where helicopters are operating as well as along their flight path. Typically, helicopters may generate noise levels of 89 to 99 dBA at 50 feet when in flight at 200 feet. Light-duty helicopters would also be used during the stringing phase of construction. It is anticipated that helicopter stringing activities would proceed at a rate of approximately 2,000 feet per day using four-hour days. Light duty helicopters would generate noise levels of approximately 80 dBA at 200 feet.

Helicopters would be used to string pilot lines for the new conductors and during periodic maintenance activities during line operation. A helicopter may be also be used to assist with tower installation for the Columbia River crossing. When a helicopter is used, towers would be preassembled at one or more central staging areas and then transferred by helicopter to tower sites. The helicopter would hover at central staging areas for two to five minutes per tower as it picked up each tower section, and would then hover at each tower site for two to 10 minutes during a one hour period while the tower sections are placed on the foundation.

The installation of spherical markers on ground wires, should they be required over the Columbia River, could result in minimal additional construction noise impacts caused by helicopters. Some short-term impacts from the additional use of lifts or helicopters could occur, but due to the limited nature of these impacts, they are not expected to cause any noise significance thresholds to be exceeded or to change the impact assessment for noise.

Project design features would be used to minimize audible noise impacts. Project design features used during construction that would reduce noise impacts in the vicinity of NSAs include:

- LU-10 - Advanced notice of construction activities will be given to landowners and residents potentially affected by construction activities. Adequate access to existing land uses will be provided during periods of construction and landowners notified of alternative access. Nighttime construction near noise-sensitive land uses (e.g., residences) will be avoided.

- PHS-7 - Limit construction activities to daytime hours.
- PHS-11- Pacific Power will identify and provide a public liaison person before and during construction to respond to concerns of neighboring receptors, including residents, about noise construction disturbance.
- PHS-12 - Pacific Power will establish a toll-free telephone number for receiving questions or complaints during construction and develop procedures for responding to callers.

4.16.3.4 Radio Noise

The impulsive corona currents cause wide-band electric and magnetic “noise” fields. This radio noise spans the frequency spectrum from below 100 kHz to approximately 1,000 megahertz (MHz). Inclement weather and high altitude increase radio noise levels. This noise from transmission lines can produce interference to an AM signal such as a commercial AM radio audio signal (i.e., radio noise) or the video portion of a TV station (i.e., TV noise). FM radio stations and the audio portion of a TV station signal (which is also frequency modulated) are generally not affected by noise from a transmission line. Radio noise is measured in units of dB based on its field strength referenced to a signal level of one microvolt per meter (μV/m) (IEEE 1986). Like audible noise, since it is due to corona activity, radio noise is more likely for lines at higher voltages (345 kV and above) with higher conductor-surface gradients, particularly at higher altitudes and in inclement weather. Radio noise performance is considered in the design of higher voltage lines at 345 kV and above.

4.16.4 Electric and Magnetic Field Effects

4.16.4.1 Electric Field Effects

Short-term electric field effects involve potentials and currents that may be induced on objects such as conductive roofs or buildings, fences, vehicles, or agricultural equipment near high-voltage lines. These potentials and currents may result in perceptible shocks or current flow if sufficiently large. The magnitude of induced currents and potentials on objects or equipment under the proposed lines would depend on the magnitude of the electric field, the size and shape of the object, and the object’s connection (resistance) to ground. Grounding the object would reduce the induced potential to essentially zero and eliminate the object as a source of shocks or currents. Objects that are not grounded or poorly grounded may be a source of currents or shocks.

Fences or metal objects that are within the ROW should be grounded. Grounding would eliminate induced currents or potentials on these objects as a concern. Unlike fences or buildings, mobile equipment such as vehicles and agricultural machinery cannot be permanently grounded. The NESC requires that for high-voltage power lines, such as the proposed 230 kV line, sufficient conductor clearance to ground be maintained to limit the short-circuit current induced in the largest anticipated vehicle under the line to 5.0 mA or less (NESC 2007). If necessary, this can be accomplished at locations where large vehicles are anticipated by increasing the line height, providing shielding of the electric field, or by limiting access.

4.16.4.2 Magnetic Field Effects

Magnetic fields associated with transmission lines can induce voltage and current in long conducting objects that are parallel to the transmission line. As with electric-field induction, these induced voltages and currents are a potential source of shocks. A fence, irrigation pipe, pipeline, electrical distribution line, or telephone line forms a conducting loop when it is grounded at both ends. The earth forms the other portion of the loop. The magnetic field from a transmission line can induce a current to flow in such a loop if it is oriented parallel to the line. If only one end of a fence is grounded (possible loop), then an induced voltage appears across the open end of the loop. The possibility for a shock exists if a person closes the loop at the open end by contacting both the ground and the conductor. The magnitude of this potential shock depends on the following factors: the magnitude of the magnetic field; the length of the object (i.e., the longer the object, the larger the induced voltage); the orientation of the object to the transmission line (i.e., parallel as opposed to perpendicular; no induction occurs on perpendicular loops); and the amount of electrical resistance in the loop (i.e., high resistance limits the current flow).

Magnetically induced currents from powerlines have been investigated for many years. Mitigating measures have been developed and are available. Studies of gas pipelines near transmission lines have developed prediction methods and mitigation techniques for induced voltages on pipelines (Dabkowski and Taflove 1979; Taflove and Dabkowski 1979). Similar techniques and procedures are available for irrigation pipes and fences. Grounding policies employed by utilities for long fences reduce the potential magnitude of magnetically induced voltage and currents.

Magnetic fields can cause distortion of the image on older style video display terminals and computer monitors (cathode-ray tubes). The threshold magnetic field for interference depends on the type and size of monitor and the frequency of the magnetic field. Interference has been observed for certain monitors at fields at or below 10 mG (Baishiki et al. 1990; Banfai et al. 2000). The problem typically arises when cathode-ray tube computer monitors are in use near electrical distribution or transmission facilities in large office buildings. This is becoming less of a concern with the advent of flat screen monitors, such as used in laptop computers. Flat screen monitors are not susceptible to AC magnetic fields. Some specialized equipment (for instance, certain medical equipment such as a MRIs or test equipment such as a scanning electron microscope) may be sensitive to even lower levels of magnetic field. However, equipment that is very sensitive to magnetic fields typically has shielding and is installed in a protected environment, to shield them from the magnetic fields of one to 10 mG or higher that can be found in buildings due to their wiring, lights, and other equipment. Mitigation methods for magnetic fields are available and involve grounding practices, shielding, device geometry, and distance.

4.16.5 Field Induction (Induced Currents and Nuisance Shocks)

The electric fields associated with a transmission line can induce small electric currents in metallic objects adjacent to or under transmission lines. Metallic roofs, vehicles, equipment, and fences are examples of objects that can develop a small electric charge when in proximity to high-voltage transmission lines. The amount of induced charge depends on the characteristics and size of the object, its grounding, and the electric field strength. An electric current can flow when an object has an induced charge and a path to ground. The amount of current flow is determined by the impedance of the object to ground and the voltage induced between the object and ground. The amount of induced current that can flow is important for evaluating the potential for nuisance shocks to people and the possibility of other effects such as fuel ignition.

The threshold of perception is approximately 1.0 mA for humans (Dalziel and Mansfield 1950). If the current is increased sufficiently beyond a person’s perception threshold, it can become bothersome and possibly startling. Larger currents can cause the muscles of the arm and hand to involuntarily contract so that a person cannot let go of an object. The value at which 99.5 percent of men, women, and children can still let go of an object is approximately 9.0, 6.0, and 5.0 mA, respectively. Transmission lines are designed such that the maximum amount of current induced on the largest metallic object normally expected under the line would be less than 5.0 mA.

In the process of establishing contact with a vehicle or metallic object under a transmission line, a small arc may occur. This is often called a nuisance shock since it can be annoying. Nuisance shocks and induced currents can be eliminated by proper grounding of the object, shielding it from electric fields, or positioning it farther from the transmission line.

Grounding of fences and large metal structures under or near the lines would eliminate these objects as sources of potentials or currents. Agricultural activities can occur near or under transmission lines. However, mobile objects like vehicles or pieces of farm equipment cannot be grounded permanently and thus can develop a potential and currents while under or near the transmission line.

Placing a ground strap on vehicles or equipment would help ground the vehicle, mitigating induced currents or potentials. Dragging a log chain from large equipment that passes under high-voltage lines can be used to provide grounding. Simply avoiding stopping to enter or exit vehicles while under high-voltage lines is another common sense way to avoid concern with induced potentials or currents.

4.16.6 Stray Voltage

Stray voltage refers to a phenomenon that is primarily of concern in wet environments usually involved with an AC distribution system. Transmission lines such as the one proposed are not normally associated with the phenomenon of stray voltage because the transmission line is a balanced, three-phase line without any direct electrical connection to end-user facilities.

Stray voltage or current is a problem whereby currents or potentials on conductive objects and metal work can come in contact and flow through humans or animals. Stray voltage is often a concern involving the farm electrical system and the local utility distribution system where a potential is developed on the grounded neutral system of the farm or utility. If an animal or human comes in contact with metal equipment that is at a different potential than the ground on which they are standing, a current may flow through the animal, or person, to ground and the potential be detected. Usually if this potential difference exists, it is too small to generate any physical or behavioral changes. In the case of nearby transmission lines, fences or piping that pass under or near the transmission line and connect back to a farm can be the source of currents and potentials on the farm. Stray voltage may be the result of corrosion or broken ground connections. Good grounding practices would reduce or eliminate this concern. The Proponent maintains programs for on-site investigation of stray voltage concerns.

4.16.7 Cardiac Pacemakers

Concern has focused on potential interference to cardiac pacemakers and defibrillators. A cardiac pacemaker monitors the electrical activity of the heart. If the heart fails to beat, the pacemaker administers a small stimulus to trigger the “missing” beats. An implanted cardiac defibrillator similarly monitors the electrical activity of the heart but is designed to block disorganized contractions of the heart (i.e., arrhythmias) by administering a strong electrical shock to restore normal heart rhythms. Exposure to electric and magnetic fields could affect the function of these devices if induced signals on sensing leads are interpreted as natural cardiac activity (Griffin 1986; CCOHS 1988; Barold et al. 1991). However, the opportunities for exposure and interference from powerlines are lower than for contact with ordinary household appliances.

Due to recent design improvements, many pacemakers in use would not be particularly susceptible to electrical fields. The manufacturers of pacemakers have designed their devices in various ways to minimize potential interference from external sources, including powerline EMF. For example, the increasingly prevalent bipolar pacemaker models are virtually immune to interference. There remains a small possibility that some pacemakers, particularly those of older designs, and with single-lead electrodes, may sense potentials induced on the electrodes and leads of the pacemaker and provide unnecessary stimulation to the heart.

There are two general types of pacemakers: asynchronous and synchronous. The asynchronous pacemaker pulses at a predetermined rate. It is practically immune to interference because it has no sensing circuitry and is not exceptionally complex. The synchronous pacemaker, on the other hand, pulses only when its sensing circuitry determines that pacing is necessary. Interference resulting from transmission line electric or magnetic fields can cause a spurious signal in the pacemaker's sensing circuitry. However, when these pacemakers detect a spurious signal, such as a 60 Hz signal, they are programmed to revert to an asynchronous or fixed pacing mode of operation and return to synchronous operation within a specified time after the signal is no longer detected. The potential for pacer interference depends on the manufacturer, model, and implantation method, among other factors.

Cardiovascular specialists do not consider prolonged asynchronous pacing to be a problem. Periods of operation in this mode are commonly induced by cardiologists to check pacemaker performance. Although the electric field within areas of a transmission line ROW may affect the operation of some models of pacemakers by causing them to revert to asynchronous pacing, this would only be for short duration while walking under the transmission line and is not considered harmful. The vehicle compartment of a car or truck or the cab of agricultural equipment (e.g., combine or tractor) shields the occupant from the electric field and thus there would not be an effect on a pacemaker while in a vehicle or cab while under the transmission line. Pacemakers in areas outside the transmission line ROW would not be affected. Before walking under the conductors of a high-voltage transmission line on the ROW, those with pacemakers or defibrillators should check with their physician if they have concerns.

4.16.8 Global Positioning Systems (GPS), Satellite Receivers and Cell Phones

GPS units, satellite receivers, cell phones, and community communication systems typically operate at high frequencies in the tens to hundreds of megahertz or even into the gigahertz range. These systems also often use FM or digital coding of the signals so that they are relatively immune to the electromagnetic interference from transmission line corona.

GPS units are used in a wide range of activities including several important agricultural activities in the study area such as monitoring pivot irrigation, tracking wheeled and tracked equipment movements during farming operation, and checking the orientation of aerial spraying aircraft. GPS units operate in the frequency range of 1.2 to 1.6 gigahertz. Tests with satellite receivers operate at frequencies from 3.4 gigahertz to 7.0 gigahertz and have shown no effect from transmission lines unless the receiver was trying to view the satellite through the transmission tower or the conductor bundle of the transmission line. Repositioning the receiver by a few feet was sufficient to eliminate the obstruction and reduced signal. Mobile phones operate in the radiofrequency range of about 800 million Hz, 1,900 million Hz, or higher frequencies. A million hertz is 1.0 MHz. Electric and magnetic fields at these high frequencies have very different physical characteristics from 60 Hz power frequency electric and magnetic fields. Due to the frequencies used by these devices and the modulation and processing techniques used, interference effects are unlikely.

Modern farming equipment uses GPS to guide tractors used for planting, cultivation, and harvesting. Modern guidance systems have an accuracy of one to two inches. It should be noted that GPS accuracy can be impacted by many factors including atmospheric conditions; satellite constellation and geometry; the design, quality, and position of the GPS antennas and receivers; signal interference; and "multipath." Of these, a transmission line and its structures could conceivably contribute to signal interference and multipath.

Signal interference occurs when other signals at the same frequency as the satellite signal are present. Multipath occurs when objects such as buildings or parts of the tractor itself reflect the GPS satellite signal so that the satellite signal arrives at the receiver later than it would have if it had followed a straight line from the satellite. A study commissioned by EPRI found that signal interference is “unlikely” based on the design of GPS receivers and their ability to separate the GPS signal from background noise (Silva and Olsen 2002). Another study compared the accuracy of real-time kinematic GPS receivers at different locations with respect to transmission lines and towers (Gibblings et al. 2001). This study concluded that multipath from transmission towers could result in GPS system initialization errors (i.e., the system reports the wrong starting location) 1.1 percent to 2.3 percent of the time. This study also reported that the GPS system software was able to identify and correct these initialization errors within the normal startup time. This study reported initialization errors due to electromagnetic interference from energized overhead transmission lines when the GPS receiver was located outside the vehicle, but concluded that “most, if not all of this effect can be eliminated by shielding the receiver and cables.” Placing the receiver inside the vehicle used in the study significantly reduced the initialization errors.

Corona-generated radio interference may cause disruption on AM communications bands in addition to AM radio such as the citizen’s band and some mobile bands. However, mobile-radio communications are not susceptible to transmission-line interference because they are generally FM. Similarly, cellular telephones operate at a frequency of 900 MHz or higher, which is well above the frequency where corona-generated radio noise is prevalent. GPS systems operate at a frequency of 1.57 gigahertz and have been shown to be unaffected by radio noise from high-voltage transmission lines (Silva and Olsen 2002). Satellite receivers operate at even higher frequencies in the 3 to 6 gigahertz band. For these higher frequency devices, the receiver has to be essentially looking directly at the conductor before it may be affected (Chartier et al. 1986). In the unlikely event that interference occurs with these or other communications, mitigation would be easily achieved with the techniques used for AM radio interference such as a slight antenna relocation or orientation. As digital signal processing has been integrated into these communication systems, the potential interference impact of corona-generated radio noise has decreased.

4.16.9 Aerial Spraying

Aerial spraying can involve dry applications (usually fertilizer) and liquid applications of fungicides and pesticides. A field can receive up to five to 10 applications per year depending on the type of crop and preferences of individual operators. While there are different makes of crop-spraying aircraft, a typical product load weighs approximately 275 to 300 pounds with an effective range of 25 to 30 miles.

Pilots typically spray with the aircraft eight to 15 feet above group level, with the height greater when crops are taller. Taking into account height above ground, size of aircraft and the nose-down angle, the maximum height of the tail of the aircraft is approximately 20 to 25 feet above ground surface. The presence of a transmission line could result in increased risk to crop duster pilots or others on the ground. Larger transmission lines like the one proposed for this Project are typically easier to see than smaller voltage lines. The presence of a transmission line could affect spray coverage. Spray is applied at a downward angle to reduce over-spray and, as a result, areas immediately adjacent to the transmission structures could receive less product than desired.

The extent of agricultural land in the Project area that currently receives aerial spraying is unknown, but this type of spraying is most likely to occur in areas where crops are grown, and to a much lesser degree, in areas of range where herbicides and insecticides are applied to control noxious weeds and insects.

The National Transportation Safety Board (NTSB 2008) maintains a data base of aviation accidents. This data base indicated that over a six-year period, from January 1, 2003 to December 19, 2008, nationwide, there were a total of 484 agriculture-related accidents investigated, of which 49 (10 percent) were fatal. Most of these accidents were related to electrical power lines, but not all of them were. Some were related to telephone wires, other aerial wires, or guy wires on other utility poles. The investigation reports do not specify the type of transmission line that was involved but considering details such as height from the ground, the number of lines in one location and visibility, the reports suggest that smaller lines are much more involved in aviation accidents than the 230 kV and 500 kV lines in the Project area.

The 230 kV proposed Project would be larger and more visible than smaller overhead lines and therefore higher and more visible to pilots. Currently, there are numerous large transmission lines in the Project area. Aerial spraying pilots would need to be sensitive to their presence and skilled when conducting spraying operations near the lines.

4.17 CUMULATIVE EFFECTS

This section describes the potential cumulative effects associated with the Project. The Project, in combination with identified past, present and reasonably foreseeable actions, could potentially result in cumulative effects to the natural, physical, and human resources described in Sections 3.2 through 3.15 of this Environmental Impact Statement (EIS). The following sections describe the regulatory framework, the cumulative effects analysis methodology used, temporal and geographic scope of the analysis for each resource, actions considered and the cumulative effects analysis for each resource.

4.17.1 Regulatory Framework

The evaluation of potential cumulative effects associated with the Project is consistent with the following regulations and guidance:

- Council on Environmental Quality (CEQ) *Regulations for Implementing the Procedural Provision of the National Environmental Policy Act (NEPA)* (40 Code of Federal Regulations [C.F.R.] 1500-1508, 1978 as amended) (CEQ 1986);
- U.S. Environmental Protection Agency (EPA) *Procedures for Implementing the Requirements of the CEQ on NEPA* (40 C.F.R. 6 [2009]);
- CEQ *Considering Cumulative Effects under NEPA* (January 1997) (CEQ 1997);
- CEQ *Guidance on the Consideration of Past Actions in Cumulative Analysis* memorandum (June 24, 2005) (CEQ 2005);
- EPA *Consideration of Cumulative Impacts in EPA Review of NEPA Documents,* EPA 315-R-99-002 (May 1999);
- Bureau of Land Management (BLM) *NEPA Handbook*, H-1790-1 (2008).

4.17.2 Definition

Cumulative impact, as defined by the CEQ (40 C.F.R. 1508.7), is the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes other such actions. As stated in the CEQ handbook, "Considering Cumulative Effects" (CEQ 1997), cumulative impacts need to be analyzed in terms of the specific resource, ecosystem, and human community being affected and should focus on effects that are truly meaningful.

4.17.3 Methodology

The analysis of cumulative effects was accomplished using four steps:

Step 1 - Identify Resources Affected
In this step, each resource affected by any of the alternatives was identified. These are the same resources as described in the affected resources section in Chapter 3.

Step 2 - Establish Boundaries
In order to identify the past, present, and reasonably foreseeable actions to consider in the cumulative effects analysis, affected resource-specific spatial and temporal boundaries must be identified. The spatial boundary is the area where past, present and reasonably foreseeable future actions have, are, or could take place and result in cumulative impacts to the affected resource when combined with the impacts of the Proposed Action. This boundary is defined by the affected resource and may be a different size than the proposed Project area. The temporal boundary describes how far into the past and forward into the future, actions should be considered in the impact analysis. Appropriate spatial and temporal boundaries may vary for each resource.

Step 3 - Identify Cumulative Action Scenario
In this step, the past, present, and reasonably foreseeable future actions to be included in the impact analysis for each specific affected resource are identified. These actions fall within the spatial and temporal boundaries established in Step 2.

Step 4 - Cumulative Effects Analysis
This final step involves the analysis of the impacts of the actions identified in Step 3 in addition to the impacts of the Proposed Action. This will result in the total cumulative impact for each resource.

4.17.4 Scope of the Analysis

4.17.4.1 Introduction

The determination of what past, present, and reasonably foreseeable future actions to consider in the impact analysis is based on the resources being affected by the Proposed Action. Guidance on determining what actions to consider in the cumulative impact analysis comes from a variety of sources.

The CEQ has produced several guidance documents including a document entitled "Guidance on Consideration of Past Actions in Cumulative Effects Analysis." This document states that consideration of past actions is only necessary in so far as it informs agency decision making. Typically the only types of past actions considered are those that continue to have present effects on the affected resources. This present effect will dictate how far in the past actions are considered and the impacts of these past actions are largely captured in the discussion of the affected environment in Chapter 3 for each resource. The guidance states that "agencies are not required to list or analyze the effects of individual past actions unless such information is necessary to describe the cumulative effect of all past actions." Agencies are allowed to aggregate the effects of past actions without "delving into the historical details of individual past actions."

Present actions are those that are currently occurring and also result in impacts to the same resources as would be affected by the Proposed Action.

Reasonably foreseeable future actions are those actions that are likely to occur and affect the same resource as the Proposed Action. The determination of what future actions should be considered requires a level of certainty that they will occur. This level of certainty is typically met by the completion of a permit application, the subject of approved proposals or planning documents, or other similar evidence. Determining how far into the future to consider actions is based on the impact of the Proposed Action. Once the impacts are no longer experienced by the affected resource, future actions beyond that would need not be considered. For the purposes of this EIS, the future actions being considered are those that will occur over the time it takes temporary impacts to be mitigated or eliminated. The expected physical operational service life of a transmission line is approximately fifty (50) years; however, except for TCPs and visual resources, this is not an appropriate time horizon in which to consider future actions because the impacts from construction of the transmission line are greatly reduced if not eliminated, the impacts from operation and maintenance are low and insignificant, and future actions over that period are speculative in nature. For TCPs and visual resources, consideration of future actions would be for the life of the line because while the line is present, impacts to these resources would potentially be occurring.

4.17.4.2 Geographic Scope

The geographic scope of the cumulative effects for each issue or resource was established to help bound the description of the affected environment. In most cases, the geographic scope was first based upon the Vantage-Pomona Heights Transmission Line Project area that would result in direct effects, rather than jurisdictional boundaries. Then, as appropriate for each resource area, a broader area was selected to include areas where potential indirect effects could occur. The geographic scope of cumulative effects (referred to as the CE Area) extends beyond the scope of direct effects, but not beyond the scope of the direct and indirect effects of the proposed Project. If the proposed Project would have no direct or indirect effects to a particular resource, a cumulative effects analysis was not conducted for that resource.

4.17.4.3 Timeframe of Analysis

For each resource, a timeframe was established for analyzing cumulative effects. The timeframe encompasses the full duration of anticipated effects. Timeframes, like geographic scope, could vary by resource. These timeframes were based upon the duration of the direct and indirect effects of the proposed Project.

4.17.5 Past, Present and Reasonably Foreseeable Future Actions

Table 4.17-1 summarizes the past, present and reasonably foreseeable future actions that could affect the various resources. Those requiring additional explanation are discussed in the narrative following Table 4.17-1.

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TABLE 4.17-1 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS BY AFFECTED RESOURCE

AFFECTED RESOURCE	PAST ACTIONS	PRESENT ACTIONS	REASONABLY FORESEEABLE FUTURE ACTIONS
Wildlife	Agricultural conversion; livestock grazing operations, road and railroad construction; hydropower development; military training operations; construction of other transmission lines and substations motorized recreation use; construction of communication sites; habitat loss/fragmentation; increased fire cycles; influx of noxious weeds/invasive species	Agricultural activities; livestock grazing operations; military training operations and other ongoing land uses and practices; habitat loss/fragmentation; increased fire cycles; influx of noxious weeds/invasive species	Ongoing agricultural activities potential for new agricultural land conversion, residential/subdivision development depending on economic situation, ongoing military training activities at the Joint Base Lewis-McChord Yakima Training Center (JBLM YTC), ongoing operation and maintenance of the Vantage and Pomona Heights substations, ongoing operation of Columbia River dams, proposed Saddle Mountain Wind Project
Vegetation	Agricultural conversion; livestock grazing operations, road and railroad construction; hydropower development; military training operations; construction of other transmission lines and substations motorized recreation use; construction of communication sites; habitat loss/fragmentation; increased fire cycles, influx of noxious weeds/invasive species	Agricultural activities; livestock grazing operations; military training operations and other ongoing land uses and practices; habitat loss/fragmentation; increased fire cycles, influx of noxious weeds/invasive species	Ongoing agricultural activities potential for new agricultural land conversion, residential/subdivision development depending on economic situation, ongoing military training activities at the JBLM YTC, ongoing operation and maintenance of the Vantage and Pomona Heights substations, ongoing operation of Columbia River dams, proposed Saddle Mountain Wind Project; unknown communication sites
Land Use	Construction and operation of Columbia River dams and reservoirs, past agricultural activities, highway and railroad construction, construction of other transmission lines and substations, residential and subdivision development and military training operations; Conservation Reserve Program (CRP) land conversion	Agricultural activities; military training operations and other ongoing land uses and practices	Ongoing agricultural activities potential for new agricultural land conversion, residential/subdivision development depending on economic situation, ongoing military training activities at the JBLM YTC, ongoing operation and maintenance of the Vantage and Pomona Heights substations, ongoing operation of Columbia River dams, proposed Saddle Mountain Wind Project; unknown communication sites
Recreation	Construction and operation of Columbia River dams and reservoirs, past agricultural activities, livestock grazing operations, highway and railroad construction, residential and subdivision development; off road motorized recreation use	Agricultural activities; livestock grazing operations; residential and subdivision development; off road motorized recreation use and other ongoing recreational land uses and practices	Ongoing agricultural activities potential for new agricultural land conversion, residential/subdivision development depending on economic situation, ongoing military training activities at the JBLM YTC, ongoing operation and maintenance of the Vantage and Pomona Heights substations, ongoing operation of Columbia River dams, proposed Saddle Mountain Wind Project; unknown communication sites

AFFECTED RESOURCE	PAST ACTIONS	PRESENT ACTIONS	REASONABLY FORESEEABLE FUTURE ACTIONS
Transportation	Highway, local road, and railroad construction, construction and operation of Columbia River dams and reservoirs, construction of Desert Aire airstrip and residential, subdivision and commercial development	Ongoing road maintenance projects, transportation of freight and agricultural products by highways and roads and operation of the Desert Aire airstrip	Ongoing road maintenance projects, transportation of freight and agricultural products by highways and roads and operation of the Desert Aire airstrip. Ongoing operation and maintenance of the Vantage and Pomona Heights substations. Residential/subdivision development depending on economic situation, proposed Saddle Mountain Wind Project could increase traffic volumes on local roads
Visual	Construction and operation of Columbia River dams and reservoirs, past agricultural activities, highway and railroad construction, construction of other transmission lines and substations, residential and subdivision development; military training operations; communication sites	Agricultural activities; livestock grazing operations; military training operations and other ongoing land uses and practices	Ongoing agricultural activities potential for new agricultural land conversion, residential/subdivision development depending on economic situation, ongoing military training activities at the JBLM YTC, ongoing operation and maintenance of the Vantage and Pomona Heights substations, ongoing operation of Columbia River dams, proposed Saddle Mountain Wind Project; unknown communication sites
Socioeconomics	Construction and operation of Columbia River dams and reservoirs, agricultural activities, highway and railroad construction, construction of other transmission lines and substations, residential and subdivision development	Agricultural activities and operations, livestock grazing operations, operation of Columbia River dams, operation of transmission infrastructure, maintenance of transportation infrastructure, operation of military training center (JBLM YTC)	Ongoing agricultural activities potential for new agricultural land conversion, residential/subdivision development depending on economic situation, ongoing military training activities at the JBLM YTC, ongoing operation and maintenance of the Vantage and Pomona Heights substations, ongoing operation of Columbia River dams, proposed Saddle Mountain Project; unknown communication sites
Cultural Resources	Construction and operation of Columbia River dams and reservoirs, agricultural activities, highway and railroad construction, construction of other transmission lines and substations, residential and subdivision development and military training operations	Agricultural activities; military training operations and other ongoing land uses and practices	Ongoing agricultural activities potential for new agricultural land conversion, residential/subdivision development depending on economic situation, ongoing military training activities at the JBLM YTC, ongoing operation and maintenance of the Vantage and Pomona Heights substations, ongoing operation of Columbia River dams, proposed Saddle Mountain Project; unknown communication sites

AFFECTED RESOURCE	PAST ACTIONS	PRESENT ACTIONS	REASONABLY FORESEEABLE FUTURE ACTIONS
Air Quality	Construction and operation of Columbia River dams and reservoirs, agricultural activities, highway and railroad construction, construction of other transmission lines and substations, residential and subdivision development and military training operations; increased fire cycles	Agricultural activities, ongoing road maintenance; motorized off road recreation; increased fire cycles; military training operations	Ongoing agricultural activities potential for new agricultural land conversion, residential/subdivision development depending on economic situation, ongoing military training activities at the JBLM YTC, ongoing operation and maintenance of the Vantage and Pomona Heights substations, proposed Saddle Mountain Project; unknown communication sites
Water Resources	Construction and operation of Columbia River dams and reservoirs, agricultural development and irrigation	Continuing hydroelectric operations, agricultural activities and irrigation	Ongoing hydroelectric operations, agricultural activities and irrigation
Soils and Geology	Agricultural activities; livestock grazing operations; gravel mining; military training operations; highway and railroad construction; construction of other transmission lines and substations; hydropower development/Columbia Basin; residential subdivision development	Agricultural activities; livestock grazing operations; gravel mining; livestock grazing and ranching and other ongoing land uses and practices and military training operations	Ongoing agricultural activities potential for new agricultural land conversion, residential/subdivision development depending on economic situation, ongoing military training activities at the JBLM YTC, ongoing operation and maintenance of the Vantage and Pomona Heights substations, proposed Saddle Mountain Wind Project; unknown communication sites
Public Health and Safety , and Noise	Construction and operation of Columbia River dams and reservoirs, past agricultural activities, highway and railroad construction, construction of other transmission lines and substations, residential and subdivision development; military training operations; communication sites	Agricultural activities; livestock grazing operations; military training operations and other ongoing land uses and practices	Ongoing agricultural activities potential for new agricultural land conversion, residential/subdivision development depending on economic situation, ongoing military training activities at the JBLM YTC, ongoing operation and maintenance of the Vantage and Pomona Heights substations, ongoing operation of Columbia River dams, proposed Saddle Mountain Wind Project; unknown communication sites

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- Columbia River/Priest Rapids Hydroelectric Project - The Priest Rapids Project is part of a network of dams and reservoirs that comprise the single largest coordinated hydroelectric system in the country. This project consists of the Priest Rapids dam and the Wanapum dam and their associated reservoirs and transmission lines and encompasses approximately 12,000 acres of shoreline lands and 58 miles of the Columbia River. The projects were built by the Public Utilities District No. 2 of Grant County. Construction of the 1,755 megawatts (MW) Priest Rapids Project began in 1956 and the projects (Priest Rapids and Wanapum) went into commercial operation in 1964.

  Since 1909, federal agencies have constructed 29 major water resource projects in the Columbia River watershed. Dozens of larger non-federal projects and hundreds of small impoundments have also been developed. Over time, the hydrologic regime of the Columbia River has been altered as a result of the construction of these major water storage projects. Collectively the dams and reservoirs provide power, flood control, irrigation, water supply, flow augmentation, navigation, fish habitat, recreation and cultural resource benefits.

- Transmission Lines and Substations - Numerous high voltage transmission lines and substations have been constructed since the completion of the Priest Rapids hydroelectric project in the 1960s by the Bonneville Power Administration (BPA), PacifiCorp, Grant County Public Utilities District (PUD), and Puget Sound Energy. There are over 15 transmission lines that are located in the greater project area that range in voltage, from 115 kilovolt (kV), 230 kV, and 500 kV. Major substations include: Midway substation, Vantage substation, Wautoma substation, Moxee substation and Pomona Heights substation. Operation and maintenance of these transmission lines and substations would be considered present and reasonably foreseeable actions as well as past actions.

- Agriculture - European settlement began throughout the region including the Project area circa the mid-nineteenth century, with economic activity in the region consisting primarily of stock raising. A transition to agriculture and other industries occurred toward the latter part of the century with advances in irrigation technology. Agricultural development in the region improved significantly following the development of the hydro resources of the Columbia and Yakima River Basins. The availability of lower-cost hydropower and affordable irrigation were crucial to agricultural development. More than 600,000 acres of agricultural land has been brought under irrigation by the Columbia River Project, mostly in Grant County. Agricultural production is diverse, with large numbers of orchards as well as field crops. As many as 69 row crops and tree crops are grown ranging from apple and cherry orchards to wheat, potatoes and may other vegetable crops. The extensive irrigation that is essential to the agricultural industry also supports the related industries of agricultural related services food processing, and wholesale trade and trucking. Agricultural activities would be considered present and reasonably foreseeable actions as well as past actions.

- Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) – JBLM YTC is a U.S. Department of the Army (Army) training center for maneuver and live fire training within the vicinity of the Project area. It is bounded on the west by Interstate 82 (I-82), on the south by the city of Yakima, on the north by the city of Ellensburg and Interstate 90 (I-90) and on the east by the Columbia River. It comprises 327,000 acres of land, most of which consists of shrub-steppe, making it one of the largest areas of shrub-steppe habitat remaining in Washington State.

  From 1942 to 1946 the Army leased 160,000 acres of land in the area for the Yakima Anti-Aircraft Artillery Range. Then in 1951 the Army purchased 261,000 acres for the Yakima Firing

Center, which would become the modern Yakima Training Center. As disclosed in the recent Grow the Army EIS there were significant impacts with all alternatives including the no action alternative for biological resources (sage-grouse and shrub-steppe habitat) and wildland fire (Army 2010).

- Residential/Subdivision/Commercial/Industrial - Residences are predominately single-family detached housing units in the Project area. Small communities with a more densely populated area include the City of Mattawa as well as unincorporated communities of Desert Aire, Beverly, Wanapum Indian Village at Priest Rapids Dam, Schawna and Vantage located near the Wanapum Dam where I-90 crosses the Columbia River.

  Mattawa has a number of retail businesses and government service facilities in the community. Industrial-type businesses and activities occurring within the Project area are associated with light industry and agricultural processing, including food storage and processing facilities with large scale agriculture.

  Land uses within and adjacent to the Project area are varied and consist of hydroelectric facilities, small suburban residential communities, wildlife management areas, transmission lines and substations, the JBLM YTC, agricultural areas and a variety of recreation facilities. The majority of the land in the Project area is undeveloped open space.

  The predominant land uses would be considered past and present actions. There are no reasonable foreseeable projects or actions that would alter or dramatically change the present land use character of the Project area.

- Hanford Nuclear Reservation/ Hanford Reach National Monument -Previously, activities at Hanford focused on the national production of nuclear materials related to armaments and nuclear power. Established in 1943 as part of the Manhattan Project, the site was home to the B reactor, the first full scale plutonium reactor in the world. Plutonium manufactured at the site was used in the first nuclear bomb. During the Cold War, the project was expanded to include nine nuclear reactors and five large plutonium processing complexes. The weapons production reactors were decommissioned at the end of the Cold War but decades of manufacturing left behind two-thirds of the nation’s high-level radioactive waste. Today, much of the activity at Hanford is directed at cleanup efforts.

  The Hanford site occupies 586 square miles in Benton County. The land is currently uninhabited and is closed to the general public. The original site was 670 square miles and included buffer areas across the Columbia River in Grant and Franklin counties. Some of this land has been returned to private use and is now covered with orchards and irrigated fields. In 2000, large portions of the site were turned over to the Hanford Reach National Monument, the western boundary of which is near the Project area, in the vicinity of the Midway substation. The area is managed for conserving unique biological, cultural and recreation resources that have remained largely untouched over the past six decades. Activities associated with plutonium production would be considered past actions, clean-up activities would be considered present and reasonably foreseeable future actions. The National Monument would be considered a present and reasonably foreseeable future action.

- Highway and Road Construction - Construction of local and state highways and I-82 bisected native grassland, shrub-steppe habitat and agricultural lands. As population grows or additional lands are converted to agricultural use, construction and maintenance would be considered present and reasonably foreseeable actions as well as past actions.

Reasonably foreseeable actions include:

- EDP Renewables (Horizon Wind Energy) Meteorological Monitoring & Saddle Mountain West Wind Farm
  On June 30, 2010, the BLM Wenatchee Field Office issued a right-of-way (ROW) to Horizon Wind Energy (now EDP Renewables) for a wind testing and monitoring area on 22,095.51 acres of public lands in the Saddle Mountains. This ROW includes almost all of the BLM public lands in the Saddle Mountains; it authorized the placement of up to six meteorological towers for wind measurement. Ultimately, only two towers were installed, on the eastern portion of the range. The BLM recently issued a renewal of ROW to EDP for a second three-year term. Besides the public land included in the ROW, EDP has a lease and meteorological towers on private lands located in the western portion of the Saddle Mountains.

  In compliance with BLM's Wind Energy Policy, when the renewal of the wind testing and monitoring area ROW was sought, Horizon/EDP Renewables also filed an application to develop a wind energy project in the Saddle Mountains. The development application was serialized as WAOR 66523 and proposes to construct a major project (up to 150 turbines, 1.5 to 3.0 MW with a total capacity of 165 to 450 MW) on BLM and private land in the western half of the Saddle Mountains. The application has not been formally accepted by the BLM, owing to a new policy that requires the BLM to hold meetings with stakeholders (primarily agencies and tribes) prior to accepting an application. See Figure 4.17-1 for the location of the proposed Saddle Mountain Wind Farm.

- Saddle Mountain Wind Farm
  Horizon Wind Energy Northwest proposes to develop, construct, own and operate a wind power facility on Saddle Mountain in southwest Adams County. The proposed project would consist of approximately 4,540 acres of privately owned land approximately six miles southwest of Othello, Washington. The project is about a mile from BLM lands in Grant County.

  The proposed wind energy facility would consist of a string of approximately 32 wind turbines extending approximately seven miles along the ridge-top of the eastern end of the Saddle Mountains. The project would use 3-MW turbines for a total wind farm size of 96 MW. The project is 50 miles east of the Vantage-Pomona Heights Transmission Line Project area. Due to its distance from the Project area, it is not considered in the cumulative analysis.

  Other wind development project proposals are unlikely in the foreseeable future because the federal tax credit for wind energy development is set to expire at the end of 2012 and the BPA has stated that they cannot integrate and firm additional wind energy into its system in the foreseeable future. BPA currently has power purchase agreements for over 3,000 MW of wind energy in the region.

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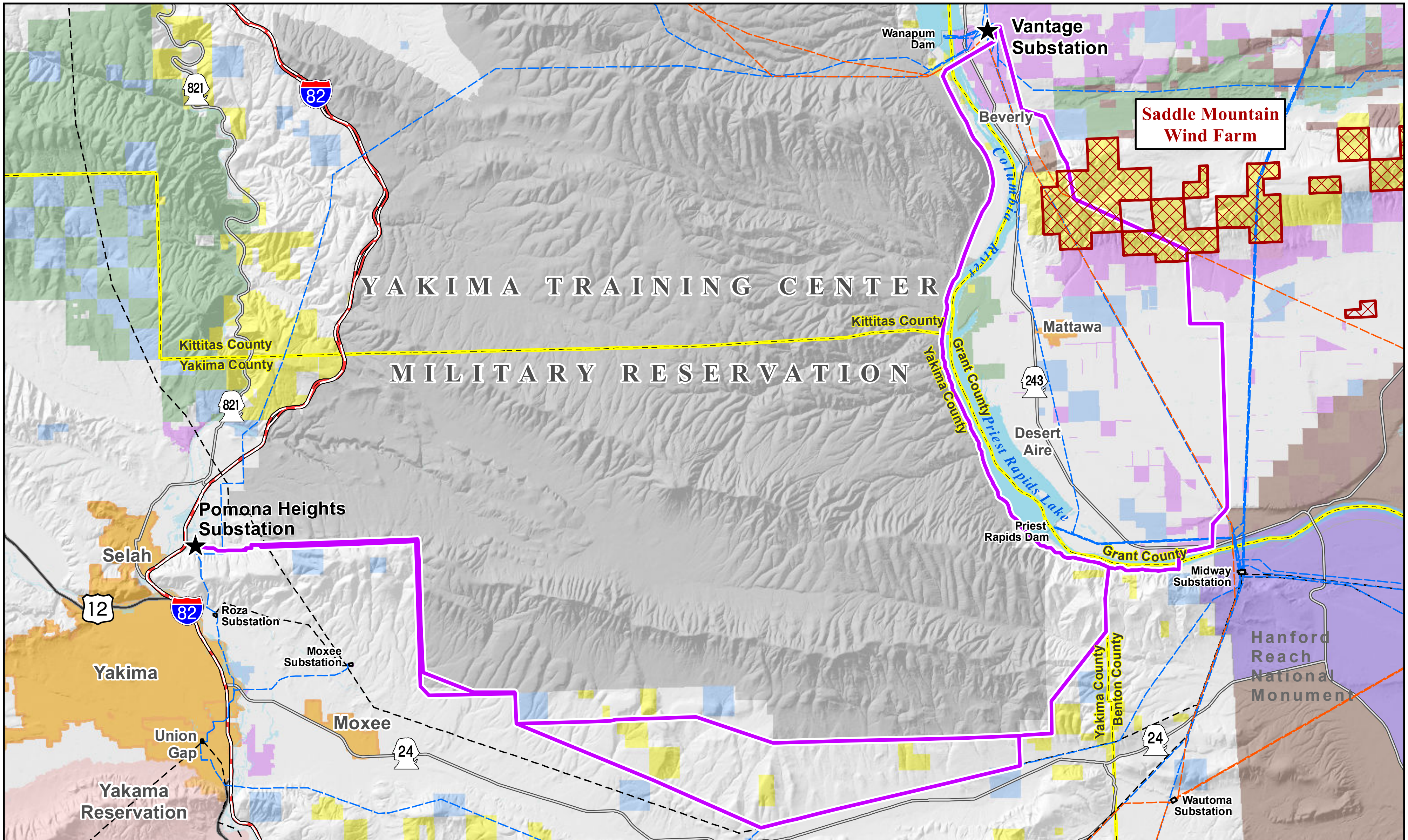

Vantage - Pomona Heights 230kV Transmission Line Project

Figure 4.17-1 Location of Proposed Saddle Mountain Wind Farm

Project Features
- Project Substation
- Alternative Route

Existing Transmission
- 500 kV Transmission
- 230 kV Transmission
- 115 kV Transmission
- Substation

Transportation
- Interstate Highway
- US Highway
- State Highway

Base Features
- County Boundary
- Municipality

Jurisdiction
- Private Individual or Company
- Bureau of Indian Affairs
- Bureau of Land Management
- Bureau of Reclamation
- Washington Department of Fish and Wildlife
- State of Washington
- Yakima Training Center (DOD)
- U.S. Fish and Wildlife Service
- Department of Energy

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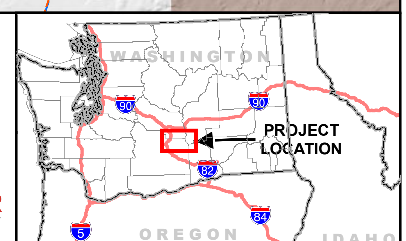
PACIFIC POWER
A DIVISION OF PACIFICORP

POWER ENGINEERS



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- Other Reasonably Foreseeable Future Projects
  There are no pending, anticipated or foreseeable applications for projects in the Project area of Yakima County, Grant County or the small portion of Kittitas County (Erickson 2011; Hooper 2011; D'Hondt 2011).

  Also there are no pending, anticipated or foreseeable projects on Bureau of Reclamation land (Loranger 2011); or that are planned by the BPA, beyond improvements within the Vantage substation to accommodate the interconnection of the proposed Vantage-Pomona-Heights 230 kV transmission line (Hutson 2011).

- Grant County Public Utility District
  The Grant County PUD has two projects in the planning or construction stage within its service territory which consists of Grant County and southern Douglas County:

  Columbia-Rocky Ford 230 kV Transmission Line
  Grant County PUD plans to build a new 230 kV transmission line that will extend 33 miles east of the BPA Columbia substation located west of the intersection of Palisades Road and Highway 28 in Douglas County to the Rocky Ford substation located on the east side of Highway 17, near Rocky Ford Creek in Grant County. The anticipated completion date for the project is the winter of 2013. The project is located near Quincy and Ephrata, Washington; north of I-90, over 60 miles from the Vantage-Pomona Project area. Due to its distance from the Project area, the Grant County PUD project is not considered in the cumulative analysis.

  Geneva Substation
  This substation project is located within the community of Mattawa in Grant County. The anticipated completion date is fall 2011. While this project is with the Project area, it has been completed and therefore is not considered a reasonably foreseeable future project for the cumulative analysis.

  Integrated Resource Plan
  The Grant County PUD has prepared an Integrated Resource Plan (IRP) that systematically considers supply side and demand side resources to meet current and projected load requirements for a planning period of 10 years (2010 through 2020). The IRP examined the District's current and future electric demand and future energy market conditions under a number of likely future scenarios. The planning effort concluded that the District has sufficient stable generation resources to meet projected demand and specific resource project additions would be studied further if required.

- Renewal of Operating License for Columbia Generating Station on the Hanford Reservation
  The Columbia Generating Station (an existing nuclear power plant) is located on the Department of Energy, Hanford Reservation over 25 miles southeast of the Vantage-Pomona Heights Transmission Line Project area in Benton County. The Nuclear Regulatory Commission (NRC) prepared an environmental report in 2010 addressing the renewal of the Columbia Generating Station operating license for an additional 20 years of plant operation beyond the current license operating period. License renewal would extend the facility operating license to December 20, 2043. The nature of the action is the renewal of an operating license. The generating station would continue operate as it has historically. No new development actions are associated with the license renewal and therefore this action is not considered in the cumulative impact analysis.

4.17.6 Cumulative Effects Analysis

This section provides the analysis of any cumulative impacts when potential impacts from the proposed Project are combined with past, present and reasonably foreseeable future actions, as listed on Table 4.17-1 and described in Section 4.17.5 above. The following analysis describes these potential cumulative impacts, in the order that the affected resources are presented in Sections 3.2 through 3.15 of this EIS. For each resource, a spatial boundary and temporal boundary are described in order to properly analyze the potential impacts. Table 4.17-2 presents a summary of the spatial and temporal boundaries by resource.

It is expected that the proposed Project will not substantially contribute to cumulative impacts given the scale and extent of the impacts created by past, present and reasonably foreseeable projects. The proposed Project, expected to permanently disturb approximately 80 acres and temporarily disturb approximately 250 acres, represents a fraction of cumulative project disturbances. Fifteen other major existing transmission lines are located within the overall cumulative effects spatial boundaries of the proposed Project, with each project affecting a much greater area within this boundary, perhaps thousands of acres. While it is somewhat speculative to predict exact impacts and disturbances where specific layouts, equipment, and other pertinent information is not known, based on similar projects using 3-MW turbines, the permanent disturbance for the Saddle Mountains West Wind Farm might be as much as 675 acres or more. This represents a relatively large geographical area impact and disturbance area compared to the Vantage-Pomona Heights Transmission Line Project, which is a linear facility with widely-spaced disturbance primarily associated with structure placement. Each H-frame structure would disturb less than three square feet, and approximately 500 structures are proposed. The access and spur road construction, where necessary, would add about another 75 acres of permanent disturbance. Including work areas and other permanent disturbances, a total of 80 acres would be permanently disturbed with the proposed Project. Assuming 675 acres of disturbance associated with the wind farm, disturbances associated with the proposed Project would represent less than 12 percent of the total cumulative disturbance area when added to the affects of wide-spread agricultural, urban and military land conversion. The proposed Project will not significantly contribute to cumulative impacts.

TABLE 4.17-2 SPATIAL AND TEMPORAL BOUNDARIES BY RESOURCE

RESOURCE	SPATIAL BOUNDARY	TEMPORAL BOUNDARY
Wildlife	The full extent of the Project area, reasonably foreseeable projects and the broader geographic region.	The 50-year operational life of the proposed Project.
Vegetation	The full extent of the Project area, as well as reasonably foreseeable future actions.	The 50-year operational life of the proposed Project.
Land Use	Area in the vicinity of the route alternatives and more broadly the four counties that would be crossed by the route alternatives (Yakima, Grant and small portions of Kittitas and Benton counties).	Three to five years based on the general planning timeframes established for the affected counties under their respective county plans
Recreation	Four miles either side of the centerline of the route alternatives. This boundary was selected to be consistent with the cumulative impact analysis area for visual resources.	Three to five years based on the general planning timeframes established for the affected counties under their respective county plans
Transportation	Area in the vicinity of the route alternatives and more broadly the four counties that would be crossed by the route alternatives (Yakima, Grant and small portions of Kittitas and Benton counties).	Temporal extent is expected to be limited to Project construction, because the operation of the proposed Project would not be expected to noticeably affect local transportation patterns
Visual	Four miles either side of the centerline of the route alternatives. This boundary was selected to allow the assessment of cumulative impacts in all directions from areas approximately four miles from the alternatives.	The 50-year operational life of the proposed Project.
Socioeconomics	Spatial boundary consists of the four counties that would be crossed by the route alternatives (Yakima, Grant and small portions of Kittitas and Benton counties) because this is the area where the majority of the potential socioeconomic impacts are expected to occur.	The 50-year operational life of the proposed Project.
Cultural Resources	Four miles either side of the centerline of the route alternatives. This boundary was selected to allow the assessment of cumulative impacts in all directions from areas approximately four miles from the alternatives to account for potential visual impacts on cultural resources.	The temporal boundary for archaeological resources is expected to be limited to Project construction; mitigation for new access roads would be completed and operation and maintenance of the line would most likely no entail construction of new roads. The temporal boundary for traditional cultural properties is expected to be the 50-year operational life of the line.
Air Quality	Area in the vicinity of the route alternatives and more broadly the four counties that would be crossed by the route alternatives (Yakima, Grant and small portions of Kittitas and Benton counties).	The temporal boundary is expected to be limited to Project construction, because operation of the proposed Project would not be expected to affect air quality.
Water Resources	The full extent of the Project area, as well as reasonably foreseeable future actions within portions of five Water Resource Inventory Areas (WRIAs) including Esquatzel Coulee (WRIA 36), Lower Yakima (WRIA 37), Upper Yakima (WRIA 39), Alkali/Squilchuck (WRIA 40) and Lower Crab (WRIA 41).	The 50-year operational life of the proposed Project.

RESOURCE	SPATIAL BOUNDARY	TEMPORAL BOUNDARY
Soils and Geology	Includes the portion of the Columbia Plateau physiographic province that occurs within the Project area.	The 50-year operational life of the proposed Project.
Public Health and Safety and Noise	Area in the vicinity of the route alternatives and more broadly the four counties that would be crossed by the route alternatives (Yakima, Grant and small portions of Kittitas and Benton counties).	The 50-year operational life of the proposed Project.

Wildlife

Geographic Scope and Timeframe of Analysis
The geographic scope for the cumulative effects analysis for wildlife extends beyond the proposed Vantage-Pomona Heights Project area that was defined for the analysis of direct effects, and encompasses the broader geographic region surrounding the Project. The timeframe for this analysis extends from the historical past when European settlement began to alter the landscape by actions such as farming and livestock grazing, and extends into the future to include the 50-year operational life of the proposed Project.

Existing Wildlife and How it Has Been Affected by Past and Present Actions
Existing wildlife present within the cumulative effects area includes reptiles, amphibians, mammals, raptors, waterfowl and shorebirds, and a variety of other birds. In grassland and shrub-steppe habitats, long-billed curlew, burrowing owl and northern pocket gopher are found. The basalt cliffs and exposed rock habitats provide important nesting and cover habitats for a variety of wildlife species such as bighorn sheep, sagebrush lizard, western rattlesnake and gopher snake. Within the area, riparian and wetland habitats are associated the Yakima and Columbia Rivers, Priest Rapids Lake, Lower Crab Creek and Nunnally Lake. These riparian and wetland areas are used by a variety of species, including bald eagle (winter only), red-tailed hawk, American kestrel, great horned owl, and European starling.

Six species listed as endangered, threatened, or candidate occur or may occur within the cumulative effects area. These include: bull trout, Chinook salmon, greater sage-grouse, gray wolf, steelhead, and Washington ground squirrel. Seventy-three special status species occur or may occur within the Project area. These include state of Washington listed (endangered, threatened, critical, and vulnerable) species, BLM Sensitive species, and USFWS Animal Species of Concern.

Wildlife in the Project area have been impacted by past and present actions such as: agricultural conversion; livestock grazing operations, road and railroad construction; hydropower development; military training operations; construction of other transmission lines and substations motorized recreation use; construction of communication sites; habitat loss/fragmentation; increased fire cycles; and an influx of noxious weeds/invasive species. The Project area lies within the Columbia Plateau ecoregion; an arid sagebrush (*Artemisia* spp.) steppe and grassland that is surrounded by ecoregions that are typically moister, forested and mountainous (EPA 2010). Before the arrival of settlers in the early 1800s, approximately 15 million acres of steppe habitat existed in eastern Washington (Daubenmire 1970; Stinson et al. 2004). Currently, it is estimated that about 50 percent, approximately 7.4 million acres, remains in Washington. The majority of the shrub-steppe habitat has been lost to agricultural cropland; however roads, residential and commercial development and inundation by reservoirs have also contributed to the reduction in shrub-steppe habitat (Stinson et al. 2004).

In addition, past and present military training operations at JBLM YTC and the presence of existing roads in the Project area have led to increased disturbance from human activities, displaced wildlife from suitable habitat, increased habitat loss and fragmentation, and facilitated the spread of noxious weeds and invasive species. In addition, the portions of the Project area within and near JBLM YTC have experience a higher incidence of fire compared with adjacent lands and naturally occurring fire cycles. Fires in these areas have resulted in further habitat loss and degradation.

Within the cumulative effects area, the primary special status species that has been impacted by past actions and is at risk of being impacted by present actions is the greater sage-grouse, a USFWS candidate species. The greater sage-grouse population in Washington has been in overall decline since 1970 (Stinson et al. 2004). Habitat loss was probably the most important factor in the elimination of sage-grouse from most of their range in Washington; however, over harvesting may have aggravated the impacts of habitat fragmentation and accelerated local extinctions (Stinson et al. 2004). The greater sage-grouse in the Project area are a portion of the Columbia Basin Distinct Population Segment (DPS). A DPS is the smallest division of a taxonomic species permitted to be protected under the ESA. In May 2001, the USFWS determined that greater sage-grouse in the Columbia Basin are a DPS under the Act and should be listed as Threatened; however, the listing was precluded by the need to protect higher priority species first (USFWS 2010).The JBLM YTC supports one of two Washington populations remaining in the Columbia Basin DPS. The second population is located in Douglas and Grant Counties. The populations of greater sage-grouse in Washington are isolated from each another, as well as the surrounding populations in Idaho and Oregon. Within the JBLM YTC, sage-grouse occupy about 124,000 acres and have designated protection on 44,320 acres, approximately 13.5 percent of the JBLM YTC. Annual surveys for leks and lek counts have been conducted by JBLM YTC personnel to monitor trends and assess population status. Ten leks have been active since 1999. As of 2011, the 22-year population average on the JBLM YTC is 281 birds (Dunham 2011).

The small size of the two remaining greater sage-grouse populations in Washington makes viability and persistence likely dependent upon recovery efforts. Small populations are affected by loss of genetic variability, inbreeding, and predation pressure, and are at risk from extreme weather conditions or fires (Stinson et al. 2004). The two remaining sage-grouse populations at the JBLM YTC and in Douglas and Grant counties are too small to be considered secure (Stinson et al. 2004). Sage-grouse recovery efforts are focused on maintaining and increasing current populations, expanding populations into adjacent areas, and reestablishing additional populations. A key factor to sage-grouse recovery success is habitat, specifically protecting remaining habitat and restoring additional habitat (Stinson et al. 2004).

Effects of Reasonable Foreseeable Future Actions on Wildlife without the Proposed Action
Reasonably foreseeable actions in the vicinity of the Project area consist of the proposed Saddle Mountain West Wind Farm and JBLM YTC training operations. Based on GAP data, habitat in the proposed Saddle Mountain West Wind Farm consists primarily of disturbed arid grasslands, typically dominated by cheatgrass. Smaller amounts of the following cover types are also present: relatively undisturbed arid steppe, typically sagebrush, bluebunch wheatgrass and Sandberg bluegrass; disturbed arid steppe dominated by sagebrush and cheatgrass or a mixture of bluebunch wheatgrass, sagebrush, Sandberg bluegrass and cheatgrass; riparian areas dominated by herbs, shrubs, and hardwoods; and agriculture. According to available priority habitat and species (PHS) data, prairie falcon, golden eagle and a priority species regional area for chukar occur near the Saddle Mountain West Wind Farm area.

Operation of the wind turbines associated with the proposed wind energy project could cause mortality to bat and bird species from collisions with the turbines. The Saddle Mountain West Wind Farm area is within the known range of three special status bat species: pallid bat, spotted bat and Townsend's big-eared bat. It is anticipated that surveys for birds and bats would be required at the Saddle Mountain West Wind Farm area prior to construction to estimate impacts to bird and bat species.

The development of the wind energy project facilities, including new transmission lines, construction of new access roads, would permanently convert small portions of shrub-steppe to facility use which could increase habitat fragmentation for a variety of species, including fragmenting a Priority Species Regional Area for chukar, a PHS species. The presence of wind turbines associated with the Saddle Mountain West Wind Farm would also directly displace individual animals from developed areas, such as by reducing available habitat for chukar; however, the specific locations of wind turbines, transmission lines, and access roads are not known at this time. It is likely that waterfowl and shorebirds would be affected only minimally by the Saddle Mountain Wind Farm Project because of the lack of suitable habitat at the project site, and the presence of extensive open water and wetlands away from the Saddle Mountain Project Site.

Noise and human activity associated with operations would displace individuals throughout the year. Special status raptor species that could occur in the Saddle Mountain West Wind Farm area include golden eagle and peregrine falcon. If suitable habitat for these species exists on the proposed wind energy project site, these species could be displaced during construction and operation, including ongoing use of access roads. Less mobile or burrowing non-game species would be susceptible to mortality from increased vehicular use on each site. If required by the wind far, spring maintenance vehicles would disrupt the breeding of some species; however, available PHS data does not indicate that the Saddle Mountain West Wind Farm occurs within wintering or breeding habitat for mule deer or has raptor nests present. It is assumed that potential impacts from the proposed wind energy project would be reduced through measures such as seasonal restrictions and buffers to avoid key habitat during nesting or wintering periods for BLM identified species, adherence to reasonable speed limits in construction areas, closing all new or improved access roads that are not required for maintenance, and implementing noxious weed control measures and reseeding disturbed areas.

The proposed Saddle Mountain West Wind Farm is located within designated Tier 3 (Occasionally Occupied Habitat) Washington Sage-grouse Management Units. JBLM YTC greater sage-grouse telemetry data (2010) indicates that individual sage-grouse do occasionally move outside of the JBLM YTC border and near the proposed wind energy project; however most of the birds appear to remain within the JBLM YTC boundary. Greater sage-grouse would likely be displaced from occasionally used habitat from the wind energy developments and access roads used during maintenance activities. No leks are no known to occur within three miles of the proposed wind farm development so courtship and breeding would not likely be affected by the proposed wind project. In addition, known leks and Tier 1 (Regularly Occupied Habitat) are located to the west and across the Columbia River from the Saddle Mountain Wind Farm area. It is assumed that potential impacts to sage-grouse would be reduced or avoided with proper planning and construction strategies, similar to those identified for the proposed Project.

Cumulative Effects on Wildlife from Reasonably Foreseeable Future Actions including the Proposed Action and Alternatives

Incremental cumulative effects upon general wildlife species and special status species could result from construction and operation of the proposed Vantage-Pomona Heights Project, the proposed wind energy project, and all associated components. The environmental effects would be both permanent (long-term operational effects) and temporary (associated with Project construction). The incremental cumulative effects would include increased collision hazard and habitat loss as a result of displacement from various permanent Project features, such as transmission line poles, access roads, and wind turbine towers. The temporary effects would include vegetation damage, increased noise and human presence during construction.

Habitat for species which utilize grassland and shrub-steppe habitats (e.g., sagebrush obligates such as the sage sparrow, Brewer's sparrow, sage thrasher, sage grouse, pygmy rabbit, sagebrush vole, sagebrush lizard, and pronghorns) is scattered throughout the area, but occurs primarily in locations adjacent to and within JBLM YTC and the Saddle Mountains. Construction in these areas would have the greatest impact on sagebrush obligate species, such as greater sage grouse. Greater sage-grouse could experience mortality through direct contact with transmission lines and wind turbines (e.g., collision and electrocution) and vehicles (e.g., nests and individuals). Direct mortality from collisions with wind turbines would likely be very low, because few deaths have been documented (USFWS 2010b). The risk of greater sage-grouse mortalities occurring as a result of electrocution from a transmission line is very low. Because research data on sage-grouse collisions with power lines are minimal, the number of sage-grouse collisions with transmission lines is difficult to evaluate (Johnson and Holloran 2010). Displacement of greater sage-grouse from suitable habitat (i.e., breeding, brood-rearing and wintering) could result from the reasonably foreseeable future actions, including the proposed Project. For the proposed Project, project design features implemented during construction and operation are anticipated to be effective at reducing the scale of biological change to sage-grouse habitat. Project design features include: maintaining intact vegetation wherever possible; minimizing the blading of native plant communities during construction, consistent with safe construction practices; utilizing overland travel where feasible; reseeding disturbed areas using an Agency approved mixture of native and non-native species or seed for revegetation as detailed in the POD; and developing and incorporating a Noxious Weed and Invasive Plant Management Plan and a Fire Protection and Control Plan into the final POD. It is assumed that potential impacts from the other projects would be reduced or avoided with proper planning and construction strategies, similar to those identified for the proposed Project.

Construction near Priest Rapids Lake could impact waterfowl concentrated in the area by causing injury and mortality through impact with transmission line. For the proposed Project, project design features such as minimizing disturbance, seasonal restrictions, and buffers are anticipated to reduce most impacts. It is likely that waterfowl and shorebirds would be affected only minimally by the Saddle Mountain Wind Farm project because of the lack of suitable habitat at the project site, and the presence of extensive open water and wetlands away from the Saddle Mountain Project Site.

For general wildlife and special status species such as bald and golden eagle, prairie and peregrine falcon, ferruginous hawk and osprey, seasonal restrictions and buffers to avoid key habitat during nesting or wintering periods, and adherence to reasonable speed limits in construction areas would reduce the incidence of collisions and disturbance from human interaction (e.g., Project Design Features BIO-13, BIO-15, BIO-16). Maintenance activities would occur for the life of the Project, but impacts would be low and short-term . Closing all new or improved access roads that are not required for maintenance would reduce disturbance following construction by limiting human accessibility to off-highway vehicles (OHVs) and other motorized vehicles (e.g., Project Design Feature BIO-14). Implementing noxious weed control measures and reseeding disturbed areas will minimize the amount of habitat fragmentation and loss due to the construction of the proposed Project (e.g., Project Design Features BIO-5, BIO-9).

The additional disturbance and new roads associated with the proposed Project and the proposed wind energy project could result in cumulative impacts, but it is assumed that potential impacts from the other projects would be reduced or avoided with proper planning and construction strategies, similar to those identified for the proposed Project. In addition, consultation with federal, state, and local agencies would need to occur to assure compliance with applicable wildlife protection regulations, and to assure the proper permits are acquired. It is expected that the proposed Project will not substantially contribute to cumulative impacts given the scale and extent of the impacts created by past, present and reasonably foreseeable projects. The proposed Project, expected to permanently disturb approximately 80 acres and temporarily disturb approximately 250 acres, represents a fraction of cumulative project disturbances. Fifteen other major existing transmission lines are located within the overall cumulative effects spatial boundaries of the proposed Project, with each project affecting a much greater area within this boundary, perhaps thousands of acres. It is assumed that the total disturbance for the Saddle Mountains West Wind Farm might be as much as 675 acres or more. This represents a relatively large geographical area impact and disturbance area compared to the Vantage-Pomona Heights Transmission Line Project, which is a linear facility with widely-spaced disturbance primarily associated with structure placement. Added to the affects of wide-spread agricultural, urban and military land conversion, this project will in general not significantly contribute to cumulative impacts to wildlife resources. The proposed Saddle Mountain West Wind Farm project would overlap with the east edge of the Project area and JBLM YTC training operations would occur adjacent to the Project area. The potential cumulative impacts to wildlife species or habitat would depend on project-specific measures to minimize habitat loss and fragmentation, disturbance and displacement from important habitats and mortality of individuals. Protection measures specific to the proposed Project are described above and are anticipated to be similar for the Saddle Mountain West Wind Farm project.

Vegetation

Geographic Scope and Timeframe of Analysis
The geographic scope of the cumulative effects analysis for vegetation, noxious weeds, and special status plants was limited to the full extent of the Project, as well as reasonably foreseeable future actions. No direct or indirect effects would likely occur to vegetation, noxious weeds, or special status plants outside of this cumulative effects area.

The timeframe for this analysis extends from the historical past when European settlement began to alter vegetation in the vicinity of the cumulative effects area by actions such as farming and livestock grazing, and extends into the future to include the 50-year operational life of the proposed Project.

Existing Vegetation and How it Has Been Affected by Past and Present Actions
Past actions that have affected natural and human resources in the cumulative effects area include: agricultural conversion; livestock grazing operations, road and railroad construction; hydropower development; military training operations; construction of other transmission lines and substations motorized recreation use; construction of communication sites; habitat loss/fragmentation; increased fire cycles; influx of noxious weeds/invasive species. Prior to European settlement, eastern Washington was covered by a relatively contiguous expanse of shrub-steppe habitat (Army 2010). Land use changes over the past century have resulted in the loss of over half of Washington's shrub-steppe habitat (Dobler 1996). Land use changes include: increases in dry-land agriculture; the use of irrigation to expand farming and orchards; and livestock grazing (BLM 1992; Yakima County 2007). These actions have resulted in the removal and permanent conversion of vegetation communities.

Vegetation in the area is currently subject to the effects of agricultural activities, such as crops and livestock grazing operations, and residential development. The influx of noxious weeds/invasive species has degraded habitat and increased fire cycles. Military training operations at JBLM YTC have also affected vegetation in the area by the use of munitions and weapons systems and off-road vehicle maneuvers that can increase the chance of wildfire ignition and may damage important resources (Army 2010). Ongoing agricultural activities, military training operations, livestock grazing and other ongoing land uses and practices are expected to continue within the Project area in the future.

Effects of Reasonable Foreseeable Future Actions on Vegetation without the Proposed Action
Reasonably foreseeable future actions in the Project vicinity consist of the proposed Saddle Mountain West Wind Farm Project. Based on GAP data, vegetation in the proposed Saddle Mountain West Wind Farm consists primarily of disturbed arid grasslands, typically dominated by cheatgrass. Smaller amounts of the following cover types are also present: relatively undisturbed arid steppe, typically sagebrush, bluebunch wheatgrass and Sandberg bluegrass; disturbed arid steppe dominated by sagebrush and cheatgrass or a mixture of bluebunch wheatgrass, sagebrush, Sandberg bluegrass and cheatgrass; riparian areas dominated by herbs, shrubs, and hardwoods; and agriculture. According to Washington Natural Heritage Project (WNHP) data, the following special status plants are known to occur within the proposed Saddle Mountain West Wind Farm project area: gray cryptantha, Snake River cryptantha, Nuttall's sandwort, fuzzytongue penstemon, Hoover's desert parsley, and Wanapum crazyweed.

Most of the effects from the wind project to vegetation, noxious weeds, and special status plants would likely occur from project construction, road building and maintenance. Effects from the disturbance to vegetation, noxious weeds, and special status plants could include changes to vegetation composition and structure, potential for the introduction and spread of noxious weeds and invasive weeds, increased fire potential and frequency, and destruction of special status species and their habitat.

Cumulative Effects on Vegetation from Reasonably Foreseeable Future Actions including the Proposed Action and Alternatives

Vegetation in the Project area is comprised primarily of grassland and shrublands. Shrublands consisting of sagebrush and rabbitbrush are the most common shrubland type in the Project area. Grasslands in the proposed Project area include annual grasses, such as field brome and cheatgrass, and perennial grasses, such as crested wheatgrass, bluebunch wheatgrass, Sandberg bluegrass, Idaho fescue, squirreltail and Thurber's needlegrass. A summary of vegetation cover types within the Project area is presented in Section 3.2, Table 3.2-1. The proposed Project could affect vegetation communities through the temporary trampling of herbaceous vegetation, the partial removal of aboveground plant cover, and the complete removal of vegetation due to construction of the transmission line, access roads and temporary work spaces. Vegetation, including noxious weeds, could be affected by construction, operation and maintenance of the proposed Project, as well as the reasonably foreseeable future actions. Short-term and long-term effects to vegetation resources would result from a variety of ground-disturbing activities, including construction of the transmission structures, substation, and access roads.

The potential effects from the proposed Project alternatives include the following:

- Long-term disturbance to 56.3 to 93.7 acres, depending on the alternative, from the construction of the proposed Project (project design features included).
- Direct or indirect impacts to special status plant species. Detailed descriptions of direct and indirect impact types are discussed in Section 4.2.
- Introduction and spread of noxious weeds and noxious weed control. Detailed descriptions of impact types associated with noxious weeds are discussed in Section 4.2.

Project design features implemented for the proposed Project are anticipated to be similar to those that would be utilized by the proposed Saddle Mountain Wind Farm Project, including:

- Best management practices and project design features implemented to reduce impacts to the project sites.
- Noxious Weed and Invasive Plant Management Plan to prevent and control the noxious weeds and invasive plants.
- Plant Protection Plan to identify specific measures to protect vegetation resources.
- Reclamation, Revegetation, and Monitoring Framework Plan to identify the reclamation stipulations for revegetating disturbed areas.

Exotic plant species are found within the Project area and are anticipated to occur within the proposed Saddle Mountain Wind Farm project area. The construction of the additional project in the area could increase the spread of exotic plants, including noxious weeds (see discussion below regarding the cumulative project's relative disturbance); however, the implementation of project design features such as limiting ground disturbance (BIO-6), revegetating disturbed areas (BIO-7), washing construction equipment before entering the Project area (BIO-11), and closing access roads not required (BIO-14) would minimize the impact.

Development of the other project in the area could also affect populations of special status plant species. For the proposed Project, complete, floristic pedestrian surveys for the targeted special status plants were conducted on accessible federal lands, which comprise approximately 29 percent of the total ROW corridor; the remaining 71 percent is composed of non-federal (state and private) land and was not surveyed. Of the 674 acres of federal lands within the 160 feet wide ROW corridor, 450 acres (67 percent) were accessible and surveyed. The remaining 224 acres of federal lands that were not surveyed and were considered inaccessible due to: restricted access on the JBLM YTC; access issues crossing private lands; dangerously steep terrain; and excessively long distances (greater than one mile) to hike from car to the ROW corridor. No known federally-listed plant species occur within the Project area; however, five species listed as endangered, threatened, or candidate are suspected to occur within or in the vicinity of the Project area. In addition to federally-listed plant species, twenty-two State-listed and BLM Sensitive plant species are known to occur within or in the vicinity of the Project area. Four special status plant species were located during the special status plant surveys: caespitose evening-primrose, Columbia milkvetch, hedgehog cactus and Nuttall's sandwort. As not all land within the route segment corridors was surveyed, there may be undiscovered populations of special status plant species in the Project area. Populations of known special status plant species will be delineated on project maps as "Avoidance Areas," and will be marked in the field prior to the start of construction. If any new populations of special status plants are discovered on federal lands during Project surveys or construction, these findings will be reported within 48 hours to the authorized officer at the appropriate land management agency and will be treated the same as currently known populations. In cases where such species are identified, appropriate action will be taken to avoid adverse impacts on the species and their habitats.

It is expected that the proposed Project will not substantially contribute to cumulative vegetation impacts given the scale and extent of the impacts created by the past, present and reasonably foreseeable project. The proposed Project, expected to permanently disturb approximately 80 acres and temporarily disturb approximately 250 acres, represents a fraction of cumulative project disturbances. Fifteen other major existing transmission lines are located within the overall cumulative effects spatial boundaries of the proposed Project, with each project affecting a much greater area within this boundary, perhaps thousands of acres. It is assumed that the total disturbance for the Saddle Mountains West Wind Farm might be as much as 675 acres or more. This represents a relatively large geographical area impact and disturbance area compared to the Vantage-Pomona Heights Transmission Line Project, which is a linear facility with widely-spaced disturbance primarily associated with structure placement. Added to the affects of wide-spread agricultural, urban and military land conversion, this project will in general not significantly contribute to cumulative impacts to vegetation. WNHP data for the proposed Saddle Mountain Wind Farm project area indicates that special status plants could occur. It is likely that any populations of special status plant species found in the area of the proposed Project or the proposed wind farm could be avoided by adjustments in pole placement and project routes.

Land Use

Geographic Scope and Timeframe of Analysis

The geographic scope for cumulative effects analysis for land use extends beyond the direct and indirect effects identified previously in this chapter related to impacts on agricultural, military, extractive/mining, and residential land uses. The CE boundary includes the broader regional area that includes reasonable foreseeable future actions that affects agricultural and range land, residential, military, and urbanized areas of the four counties in which the Project is located. This area generally extends into the west into the urbanized area of Yakima, south to Rattlesnakes Hills and I-82, east into the Hanford area and most of the Saddle Mountains, and north to the I-90. The area generally encompasses significant portions of the four counties of Yakima, Benton, Kittitas, and Grant Counties. The timeframe spans from the time of the settling of the region by Euro-Americans when the natural landscape was transformed from the essentially natural vegetation patterns to the agriculturally dominated, developed landscape of the latter part of the nineteenth century through the operational life of the Vantage-Pomona Heights 230 kV Transmission Line Project.

Existing Land Use and How it Has Been Affected by Past and Present Actions

Land use patterns have been changing over the course of the CE timeframe, but agriculture, including rangeland, has dominated over a significant portion of that period. Past actions that have affected land use in the vicinity of the proposed Project include construction and operation of the Columbia River dams and reservoirs (Priest Rapids and Wanapum dams), changing agricultural activities, highway and railroad construction, construction of numerous high voltage transmission lines and substations, residential and subdivision development and military training operations at JBLM YTC. Present and ongoing activities in the immediate vicinity of the proposed Project include agricultural land uses, primarily crop production and livestock grazing. Land use within the Project area includes land used for crops and livestock grazing, residential development consisting primarily of rural residences, commercial activities primarily related to agriculture, military training activities at JBLM YTC and operation of the Priest Rapids hydroelectric project. Conversion of agricultural and grazing activities to non-agricultural uses within the CE area has been the primary effect of past and present land use impacts. Other affects of past and present actions on existing military land use include the establishment of Sage Grouse restrictions, the construction of other transmission lines in within the JBLM YTC boundaries, and surround urban growth. Modifications to the locations and intensity of training operations have occurred due to wildlife restrictions and adjacent urban growth. The construction of transmission lines within the geographical area of analysis has affected residential and agricultural land uses by physically displacing, preventing and altering these land uses. Please also refer to Chapter 3.4 for a description of existing land uses in the Project area.

Effects of Reasonable Foreseeable Future Actions on Land Use without the Proposed Action
Reasonably foreseeable actions in the vicinity of the Project area consist of the proposed Saddle Mountain West Wind Farm, including both wind meteorological monitoring and a wind energy project (Horizon Wind Energy project). Without the Proposed Action, the project identified for cumulative analysis would primarily affect public (BLM) and private lands used primarily for rangeland/grazing. With unknown footprints, layouts, disturbance areas and extent of disturbance to grazing lands, quantification of land use impacts resulting from the construction, operation and maintenance of these facilities cannot be estimated. Generally, the implementation of the wind facility portion of project will reduce the land in the region for seasonal grazing of livestock. The footprints of industrial scale (1.5 to 3.0 megawatt) wind turbines taken together with the construction of access and string roads would result in overall low impacts considered at the regional (CE area) level, because of the large areas of grazing lands available throughout the CE area. Wind energy development would generally be compatible with the land use (e.g., grazing) currently occurring in those locations, although there would be some acreage losses. The extent of the interconnection requirements (additional transmission line facilities) is not known at this time, but would not likely be substantial due to their proximity to existing transmission lines. The short-term construction affects related to staging, laydown, tower erection and other temporary activities will not contribute to cumulative impacts. The preliminary meteorological monitoring aspects of the project would not cumulatively affect grazing land resources.

Zoning regulations established for parts of each county that are part of the Project area are designed to maintain the rural character of the area, by allowing land uses that are principally consistent with agricultural use, natural resource management, open space, conservation, or very low density rural development. (See Benton County Comprehensive Land Use Plan [Benton County 2006] and Benton County Code Title 11, Yakima County Comprehensive Plan (Yakima County 2007) and Yakima County Code, Title 15, Grant County Comprehensive Plan [Grant County 2006] and Grant County Code Title 23, and Kittitas County Comprehensive Plan [Kittitas County 2010] and Kittitas County Code Title 17).This suggests that future development that is not consistent with agriculture is likely to be concentrated in existing communities and other areas zoned for these types of uses.

Cumulative Effects on Land Use from Reasonably Foreseeable Future Actions including the Proposed Action and Alternatives
Cumulative land use resource impact (e.g., grazing) would come primarily from the construction of the wind farm, and not from the construction of the proposed Project or Project alternatives. The

approximately two to nine acres of impact (depending on alternative) on BLM/state grazing lease land (as identified in Section 4.4) and impacts on (unknown) private grazing land considered with the impacts on grazing resulting from other past, present and reasonable foreseeable projects would only be a small fraction of the overall impacts in the CE area when cumulatively considered. The proposed Project, expected to permanently disturb approximately 80 acres and temporarily disturb approximately 250 acres, represents a fraction of cumulative project disturbances. Fifteen other major existing transmission lines are located within the overall cumulative effects spatial boundaries of the proposed Project, with each project affecting a much greater area within this boundary, perhaps thousands of acres. It is assumed that the total disturbance for the Saddle Mountains West Wind Farm might be as much as 675 acres or more. This represents a relatively large geographical area impact and disturbance area compared to the Vantage-Pomona Heights Transmission Line Project, which is a linear facility with widely-spaced disturbance primarily associated with structure placement. Added to the affects of wide-spread agricultural, urban and military land conversion, this project will not significantly contribute to cumulative impacts to land use. Additionally, the differences between Project Alternatives in terms of impacts to grazing land uses would not be sufficiently different to warrant consideration of individual alternatives separately in the cumulative effects analysis.

Construction of the proposed Saddle Mountain West Wind Project would overlap spatially with the east edge of the Project area in Grant County; however, it is unlikely to coincide in time with the proposed Project. Estimated temporary and permanent disturbance from the wind project is unknown at this time. Depending upon this size of the wind farm, it could directly impact a substantial amount of shrub steppe habitat and would change use of the land occupied by the wind farm. The overall cumulative impact to land use would be attributable to the wind farm rather than the proposed transmission line project. The wind farm would require the construction of a transmission line to interconnect the facility with the regional electrical grid which would result in the incremental addition of more transmission lines in the Saddle Mountain area when taken together with the proposed Project.

Other wind development project are unlikely in the foreseeable future because the federal tax credit for wind energy development is set to expire at the end of 2012 and the BPA has stated that they cannot integrate and firm additional wind into its system in the foreseeable future.

There are no other pending, anticipated or foreseeable applications for projects in the Project area of Yakima County, Grant County or the small portion of Kittitas County in the Project area. Also there are no pending, anticipated or foreseeable projects on Bureau of Reclamation land or that are planned by the BPA, beyond improvements within the Vantage substation to accommodate the interconnection of the proposed Vantage-Pomona Heights transmission line. The Grant County PUD plans to build a new 230 kV transmission line near Quincy and Ephrata, Washington, north of I-90, over 60 north of the Project area. Due to its distance from the Project area it is not considered in the cumulative analysis. The only other project is the Geneva substation located within the community of Mattawa in Grant County. While the project is within the Project area it has been completed and therefore is not considered a reasonably foreseeable future project for the cumulative analysis.

Short-term and long-term impacts of the proposed Project would not alter the overall land uses patterns in the vicinity of the proposed Project and are relatively low and insignificant when compared to the amount of available land in Yakima and Grant counties.

The Project proponent (Pacific Power) would obtain transmission easements for construction and operation of the proposed Project on private lands and would obtain ROW grants to cross federal lands. Existing land use or ownership would not change along the majority of the transmission line ROW. The proposed Project thus would contribute incrementally and cumulative impacts would be low and insignificant on land use resources in the CE area.

Recreation

Geographic Scope and Timeframe of Analysis
The geographic scope and timeframe for cumulative effects on recreational resources extends to the visual influence distance of the transmission lines, a distance of about four miles (see visual resources cumulative effects below). The timeframe for the analysis is three to five years based on the general planning timeframes established for the affected counties under their respective county plans.

Existing Recreation and How it Has Been Affected by Past and Present Actions
Recreational activities have been occurring in the Project Area in some form or another from the time human occupation, but most recently from the time of the establishment of developed and designated recreation areas, and concludes with the decommissioning of the proposed Project. Past actions that have affected recreation in the Project vicinity include construction and operation of the Priest Rapids and Wanapum dams on the Columbia River, development of recreation areas and sites in the Project area, primarily along the Columbia River and Lower Crab Creek. Other past recreational development includes the hang gliding area in the Saddle Mountains, OHV and other activities in the Saddle Mountains Management Area, and the designation of the John Wayne Pioneer Trail/Milwaukee Corridor located on the north side of the Project area following the old Chicago, Milwaukee, St. Paul, & Pacific Railroad corridor. The trail follows the railroad corridor thorough Beverly and crosses the river along the Beverly Trestle Railroad Bridge (a National Register of Historic Places site, see Section 3.11-Cultural Resources), extending into JBLM YTC just west of Wanapum Dam.

More generally, agricultural activities, highway and road construction, construction and operation of the existing high voltage transmission lines and substations and limited commercial and residential development have also affected recreation in the area, particularly with respect to providing access to the area for recreation. Past and present development of transmission lines, roadway improvements, and residential development have visually affected and diminished recreational experiences and recreation opportunities to varying degrees along the trail. Present and ongoing activities in the Project area include agricultural activities, residential and subdivision development, off road motorized recreation use and other ongoing land uses and practices.

Effects of Reasonable Foreseeable Future Actions on Recreation without the Proposed Action
Reasonably foreseeable actions within the vicinity of the action alternatives include ongoing agricultural activities, operation of the Priest Rapids and Wanapum hydroelectric projects and potential construction of the Saddle Mountain West Wind Farm.

Wind farm development has the potential to affect recreation activities in the Saddle Mountains such as hiking and motorized OHV use by temporarily or permanently displacing or disruption these activities in the Project area. Access may be restricted and areas may be closed for hunting, hiking, and OHV use. Because the proposed Project does not significantly affect these activities, the effects of reasonably foreseeable future actions on recreation without the proposed Project would be similar to the effects with the proposed Project.

The Project could also affect hunting by temporarily disturbing wildlife and restricting future access for hunting.

Cumulative Effects on Recreation from Reasonably Foreseeable Future Actions including the Proposed Action and Alternatives
The incremental effect of the proposed Project on recreation, combined with reasonably foreseeable future actions, would result in the addition of new structures to the area. Although views from recreational areas may change, the areas themselves would not be affected. The proposed Project when viewed in the

context of the many existing high voltage transmission lines in the Project area would contribute incrementally and cumulative visual impacts to recreationists would be low and insignificant. In addition, operation of the proposed Project is not expected to affect hunting or access to existing hunting areas. New access roads would be gated to prevent hunting on private lands unless authorized by the landowner. It is assumed that potential impacts to recreation resources from the other project would be reduced or avoided with proper planning and construction strategies, similar to those identified for the proposed Project. Overall the proposed Project is not expected to contribute to potential cumulative impacts to recreation resources in the Project area.

Transportation

Geographic Scope and Timeframe of Analysis
The geographic scope and timeframe for cumulative effects on transportation resources is includes the area in the vicinity of the route alternatives and more broadly the four counties that would be crossed by the route alternatives (Yakima, Grant and small portions of Kittitas and Benton counties). The temporal extent is expected to be limited to Project construction because operation of the proposed Project is not expected to have a noticeable effect on local transportation patterns.

Existing Transportation and How it Has Been Affected by Past and Present Actions
Past actions that have affected transportation in the vicinity of the proposed Project include: highway, local road and railroad construction; construction and operation of the Priest Rapids and Wanapum dam hydroelectric projects, construction of the Desert Aire Airport and rural residential and commercial development throughout the Project area. Present transportation-related actions in the vicinity of the proposed Project include ongoing road maintenance projects, transportation of agricultural crops and freight by road and railroad, and operation of the Desert Aire Airport for small aircraft.

Effects of Reasonable Foreseeable Future Actions on Transportation without the Proposed Action
Reasonably foreseeable future actions planned in the vicinity of the proposed Project that could affect transportation include ongoing road maintenance activities and construction of wind energy facilities that would generate increased traffic volumes on local roads.

The reasonably foreseeable future wind farm project in the vicinity of the proposed Project would generate temporary increases in traffic volumes resulting from the transportation of turbines and other heavy and light vehicles using state highways and local roads to access construction project sites.

Cumulative Effects on Transportation from Reasonably Foreseeable Future Actions including the Proposed Action and Alternatives
The wind energy project would not coincide in time with construction of the proposed Project; therefore the cumulative impacts of the proposed Project associated with construction related traffic on state highways and local roads would be relatively low and insignificant when compared to existing levels of use.

Construction traffic associated with the proposed Project could result in temporary delays at localized spots. With the implementation of project design features, including the use of flaggers, signage, and traffic reroutes, where necessary, potential cumulative impacts to roads would be reduced. Similar impacts from wind farm development would be expected as a result of road closures, lane restrictions, traffic delays and road damage. However, because the proposed Project would not coincide in space or time with the reasonably foreseeable future actions, cumulative impacts are expected to be low and insignificant.

Visual

Geographic Scope and Timeframe of Analysis
The geographic scope for the cumulative effects visual resources analysis includes four miles either side of the centerline for the route alternatives. The timeframe of the analysis extends from the historical past when Euro-American settlers began to alter the landscape within these areas, into the future to include the 50-year operational life of the proposed Project.

Existing Visual Resources and How it Has Been Affected by Past and Present Actions
Past actions that have affected visual resources in the vicinity of the proposed Project include construction and operation of the Columbia River dams and reservoirs (Priest Rapids and Wanapum dams), agricultural activities, highway and railroad construction, construction of numerous high voltage transmission lines and substations, residential and subdivision development and military training operations at JBLM YTC. Present and ongoing activities in the immediate vicinity of the proposed Project include agricultural land uses, primarily crop production and livestock grazing, as well as military operations and urbanization. Natural scenic quality and intact landscapes have been reduced by the introduction of man-made elements that contrast with the character of the natural landscape, primarily over the last century, while sensitive viewers (such as recreationists and people occupying residences) observing the natural and developed landscape have increased over that time.

Effects of Reasonable Foreseeable Future Actions on Visual Resources without the Proposed Action
Reasonably foreseeable actions in the vicinity of the Project area consist of the proposed Saddle Mountain West Wind Farm Project. Construction of the proposed Saddle Mountain West Wind Project would overlap spatially with the east edge of the Project area in Grant County; however it is unlikely to coincide in time with the proposed Project.

The wind turbines associated with the proposed wind energy project would likely stand out in contrast with the surrounding landscape. The wind energy project would involve placement of industrial structures in an area with no similar structures and represent a conspicuous change to the relatively natural and rural landscape. This would disrupt the relative continuity of visual resources in the landscape. The wind project would involve structures that would create a skyline on the landscape, altering the texture of the horizon. This would noticeably diminish the smooth landscape of the horizon and reduce the openness of the terrain. These types of developments would add to the industrialization of the natural landscape, but final impacts on sensitive viewers would depend on turbine location relative to those viewers. Overall, the effects of the reasonably foreseeable future actions without the Proposed Action would be incremental and isolated.

Cumulative Effects on Visual Resources from Reasonably Foreseeable Future Actions including the Proposed Action and Alternatives
The proposed Vantage-Pomona Heights Transmission Line Project would blend with the muted colors of the surrounding landscape in most locations when seen at longer distances (such as middleground and background), although the conductor wires may stand out and contrast with the landscape under some viewing conditions. The proposed Project, when viewed in the context of the many existing high voltage transmission lines in the Project area, would contribute incrementally and overall would cause low to moderate but not significant cumulative impacts. The views of the wind turbines when combined with the existing dams and existing transmission lines would result in a more substantial adverse cumulative impact to visual resources than the proposed transmission line Project.

The addition of a wood pole transmission line (and two lattice Columbia River crossing structures), when taken together with the scale and extent of existing transmission line infrastructure and industrialization of the landscape previously occurring, would cause low and insignificant cumulative impacts and would minimally contribute to visual contrasts as a whole.

Socioeconomics

Geographic Scope and Timeframe of Analysis

The geographic scope of the cumulative effects analysis for socioeconomics consisted of the four counties that would be crossed by the route alternatives (Yakima, Grant and small portions of Kittitas and Benton counties), as well as reasonably foreseeable future actions. The majority of the potential socioeconomic impacts are expected to occur within this area.

The timeframe for this analysis extends from the construction phase into the future to include the 50-year operational life of the proposed Project.

Existing Socioeconomics and How it Has Been Affected by Past and Present Actions

Past actions that have affected socioeconomic activity in the Project vicinity include construction and operation of the Priest Rapids and Wanapum dams and hydroelectric facilities; agricultural activities; highway and railroad construction; construction and operation of the network of existing high voltage transmission lines and substations; and rural residential and commercial development. Present and ongoing activities in the immediate Project vicinity include agricultural production and operation, livestock grazing, operation of the Columbia River dams, operation of electric transmission infrastructure, maintenance of transmission infrastructure, and operation of the JBLM YTC military training center.

Effects of Reasonable Foreseeable Future Actions on Socioeconomics without the Proposed Action

Reasonably foreseeable future actions in the vicinity of the proposed Project include ongoing agricultural activities and the development of the proposed Saddle Mountain wind energy facility and associated electric transmission infrastructure. The Saddle Mountain West Wind Farm is located within Grant County. The wind energy project is not likely to result in any permanent changes in population and would have no effect on short or long-term population trends in Yakima or Grant counties. Construction of the project is likely to result in a small temporary influx of construction workers to the project area and would generate modest amounts on income for motels and RV parks. Regional resources would be more than sufficient to accommodate the small project related demand for temporary lodging.

Local project-related expenditures, employment, and construction-related earning would be small relative to total amount of economic activity in the affected counties, and would, as a result, have a low positive impact on the local economy for the duration of construction. In addition, the proposed Project would also be expected to generate sales tax in the affected counties as workers purchase goods and services.

The proposed wind energy development project would not be expected to cause significant demands on public service or facilities. During construction, public services such as police, fire and medical facilities would be needed only in cases of emergency.

Construction of the wind energy project is not expected to have high or adverse human health or environmental impacts on nearby communities (including minority or low income communities) and is, therefore, not expected to contribute to environmental justice related cumulative impacts.

Cumulative Effects on Socioeconomics from Reasonably Foreseeable Future Actions including the Proposed Action and Alternatives

Construction and operation of the proposed Project and the proposed wind energy developments are not expected to result in any permanent changes in population and would have no effect on short or long-term population trends in Yakima, Grant, Kittitas or Benton counties.

Construction of the proposed Project and the proposed wind energy development project is anticipated to result in a small temporary influx of construction workers to the Project area and would generate modest amounts on income for motels and RV parks. Construction of the proposed Project is not anticipated to occur during the same time period as construction of the proposed wind energy project; however, regional resources would be more than sufficient to accommodate the small project related demand for temporary lodging.

Local project-related expenditures, employment, and construction-related earning would be small relative to total amount of economic activity in the affected counties, and would, as a result, have a low and insignificant positive impact on the local economy for the duration of construction. This level of positive impact on the local economy is unlikely to increase because construction of the proposed wind energy project is not anticipated coincide with construction of the proposed Project. Even if the wind energy project is to coincide with the proposed Project the impact on the local economy would still be relatively low compared to the overall regional economy. This would also be the case with any other future projects were they to coincide in time with the proposed Project. The proposed Project would also be expected to generate sales tax in the affected counties as workers purchase goods and services, and this would likely be the case with other construction projects in the affected counties. The proposed Project would also generate annual property tax revenue to the affected counties from payments made by the Project proponent related to the structures in the transmission line ROW.

The proposed Project and the proposed wind energy development project would not be expected to cause significant demands on public service or facilities. During construction, public services such as police, fire and medical facilities would be needed only in cases of emergency, which would be the case for any other construction projects that could potentially coincide in time with the proposed Project. In addition, the proposed Project is not expected to have a noticeable impact on local landfill resources or their ability to handle other current or future waste streams. Therefore, the proposed Project is not expected to contribute to cumulative impacts to public services or facilities.

Construction of the proposed Project is not expected to have high or adverse human health or environmental impacts on nearby communities (including minority or low income communities) and is, therefore, not expected to contribute to environmental justice related cumulative impacts.

Cultural Resources

Geographic Scope and Timeframe of Analysis

The geographic scope of the cumulative effects analysis for cultural resources includes a boundary of four miles either side of the centerline of the route alternatives. This boundary was selected to allow the assessment of cumulative impacts in all direction to account for potential visual impacts on cultural resources. The timeframe of the analysis is the prehistoric period to the Euro-American settlement period and extending into the future to include the 50-year operation life of the proposed Project.

Existing Cultural Resources and How it Has Been Affected by Past and Present Actions

Past actions that have affected cultural resources in the vicinity of the proposed Project include construction and operation of the Columbia River dams and reservoirs (Priest Rapids and Wanapum dams); agricultural activities; highway and railroad construction; construction of numerous high voltage transmission lines and substations; residential and subdivision development; and military training operations at JBLM YTC. Past actions have also caused disturbance of cultural sites, reduction of the cultural integrity of certain sites, and removal of cultural artifacts. Many archaeological resources and traditional cultural properties are present along the Columbia River; many more were inundated when the reservoirs behind the Priest Rapids and Wanapum dams were filled. Construction of the dams, transmission lines and substations created manmade structures within the viewshed of traditional cultural properties and archaeological sites in the vicinity of the Columbia River. Agricultural activities have converted native vegetation to cropland potentially affecting subsistence farming or gathering practices within traditional cultural properties

Effects of Reasonable Foreseeable Future Actions on Cultural Resources without the Proposed Action

Reasonably foreseeable actions in the vicinity of the Project area consist of the proposed Saddle Mountain West Wind Farm. The proposed Saddle Mountain West Wind Project would overlap spatially with the east edge of the Project area in Grant County.

There is the potential for archaeological resources to be impacted during the construction of both of the wind project. Prior to construction field surveys would be required to identify the location of sites and if required, changes to the location of project facilities would be required to avoid identified sites. For traditional cultural properties (TCPs) placement of turbines and associated transmission lines for interconnection may impact viewsheds of traditional cultural properties. Specific studies for each wind project would be required to determine if traditional cultural properties may be impacted.

Cumulative Effects on Cultural Resources from Reasonably Foreseeable Future Actions including the Proposed Action and Alternatives

During construction of the proposed Project, there is also the potential for archaeological resources to be impacted. Implementation of measures described in Section 2.5.4 Project Design Features for Cultural Resources and in the Programmatic Agreement would lessen or avoid the potential for impacts to archaeological resources. However, if the proposed Project does impact previously undiscovered archaeological resources, it would contribute incrementally to the cumulative impacts to cultural resources in the area.

It is expected that the proposed Project will not substantially contribute to cumulative impacts on identified archaeological sites given the scale and extent of the impacts created by past, present and reasonably foreseeable projects. The proposed Project, expected to permanently disturb approximately 330 acres, represents a fraction of cumulative project disturbances. Fifteen other major existing transmission lines are located within the overall cumulative effects spatial boundaries of the proposed Project, with each project affecting a much greater area within this boundary, perhaps thousands of acres. It is assumed that the total disturbance for the Saddle Mountains West Wind Farm might be as much as 675 acres or more. This represents a relatively large geographical area impact and disturbance area compared to the Vantage-Pomona Heights Transmission Line Project, which is a linear facility with widely-spaced disturbance primarily associated with structure placement. Added to the affects of wide-spread agricultural, urban and military land conversion, this Project will cause low and insignificant cumulative impacts to archeological resources.

Because the proposed Project alternatives could also potentially impact the viewsheds of traditional cultural properties, it would contribute incrementally to cumulative impact to those properties. However, the cumulative effects of multiple projects on the viewsheds of specific traditional cultural properties can be determined only through consultation between the BLM and the affected Tribes.The cumulative effects from construction and operation of the proposed Project and the reasonably foreseeable future actions would include potential disturbance and illegal removal of the area's cultural resources and the potential to impact previously undiscovered archaeological resources. The incremental effect of the addition of the proposed Project to the reasonably foreseeable future actions would not be substantially different from the effects of the reasonably foreseeable futures actions alone. The proposed wind energy project and proposed Project could also have permanent or long-term effects to cultural resources through direct construction disturbance or indirect visual effects. These cultural resources could be affected by the construction of transmission lines, towers, tensioning facilities, wind energy facilities, access roads, and increased human activity related to maintenance activities. Increased human activity could make archaeological sites more susceptible to illegal collecting and/or degradation. Long-term visual or indirect effects could also occur to traditional cultural properties and other culturally sensitive sites. It is assumed that potential impacts to cultural resources would be reduced or avoided with proper planning and construction strategies, similar to those identified for the proposed Project.

Air Quality

Geographic Scope and Timeframe of Analysis
The geographic scope for the cumulative effects analysis for air quality extends beyond the Project area to include the four counties that would be crossed by the route alternatives (Yakima, Grant and small portions of Kittitas and Benton counties). The timeframe of the analysis is limited to project construction because operation of the proposed Project is not expected to affect air quality.

Existing Air Quality and How it Has Been Affected by Past and Present Actions
Past actions that have affected air quality in the proposed Project area include highway, local road and railroad construction, construction of the Priest Rapids and Wanapum dams, agricultural activities, construction of the existing transmission lines and substations, residential and subdivision development and military training operations and periodic incidence of wildfires. Present actions include agricultural activities, ongoing maintenance projects and military training activities.

Effects of Reasonable Foreseeable Future Actions on Air Quality without the Proposed Action
Reasonably foreseeable future actions in the vicinity of the proposed Project that could affect air quality include ongoing agricultural activities and potential for new agricultural land conversion, continued military training activities and the proposed wind energy project.

Cumulative Effects on Air Quality from Reasonably Foreseeable Future Actions including the Proposed Action and Alternatives
Air emission from the proposed Project would occur during Project construction, principally fugitive dust generated by the placement of transmission structures and construction or improvement of access roads, as well as the use of vehicles and heavy equipment. Quantities of emissions would be very small, temporary and localized. In addition, project design features (as described in Section 2.5) would limit emissions during both construction and operation. Impacts on air quality would be short-term during Project construction and dispersion of pollutants would be localized to the vicinity of construction activity and would quickly disperse or settle. Impacts on air quality would not be anticipated to result in the exceedence of the National Ambient Air Quality Standards (NAAQS).

Because emissions from the proposed wind energy project and the proposed Project would be temporary and would cease upon completion of construction, it is highly unlikely that emissions from one project would overlap (combine in space and time) with emissions from another project, to create a net cumulative air quality impact in the region.

Water Resources

Geographic Scope and Timeframe of Analysis
The geographic scope of the cumulative effects analysis for water resources includes portions of five Water Resource Inventory Areas (WRIAs) including Esquatzel Coulee (WRIA 36), Lower Yakima (WRIA 37), Upper Yakima (WRIA 39), Alkali/Squilchuck (WRIA 40) and Lower Crab (WRIA 41). The timeframe for the analysis extends from the historical past when Euro-American settlers began to alter water resources in the vicinity of the cumulative effects area by actions such as farming and livestock grazing, and extends into the future to include the 50-year operational life of the proposed Project.

Existing Water Resources and How it Has Been Affected by Past and Present Actions
Past and present actions that have affected water resources in the Project area include agricultural activities (e.g., irrigation, fertilizer and pesticide applications), livestock grazing, commercial and residential development, road maintenance, noxious weed and invasive species establishment, and hydroelectric dams on the Columbia River. These actions have resulted in the degradation of water resources in the Project area.

Water resources in the Project area have undergone significant alterations in the past. The segment of the Columbia River at Priest Rapids Lake has been listed as water quality impaired due to temperature and pesticides from unknown sources and Lower Crab Creek has been listed as water quality impaired due to pH, temperature and pesticides from unknown sources. Two large hydroelectric dams on the Columbia River occur within the Project area. These dams regulate flows and have altered floodplains in the area. Existing studies and related water quality data indicate that nitrate contamination of groundwater exist in the region and at least portions of the Project area, primarily due to feedlots and dairies. Project design features are anticipated to reduce most impacts from the proposed Project. These include implementing specific erosion and sediment control measures to be specified in a Stormwater Pollution Prevention Plan (SWPPP), reseeding following construction and implementing a Noxious Weed Control Plan.

Effects of Reasonable Foreseeable Future Actions on Water Resources without the Proposed Action
Reasonably foreseeable future actions in the Project vicinity consist of the proposed Saddle Mountain West Wind Farm. The Saddle Mountain West Wind Farm would be located in the Esquatzel Coulee and the Lower Crab Creek WRIAs. Lower Crab Creek is located to the north and the Columbia River is located to the west of the project area. The segment of the Columbia River at Priest Rapids Lake to the west of the Saddle Mountain West Wind Farm has been listed as water quality impaired due to temperature and pesticides from unknown sources. Lower Crab Creek, located north of the Saddle Mountain West Wind Farm project area, has been listed as water quality impaired due to pH, temperature and pesticides from unknown sources.

The temporary effects from construction, including road building, could include increased run-off and sediment delivery to perennial and intermittent streams and the Columbia River as a result of cleared vegetation and surface disturbance. If the construction periods occurred simultaneously, these water resources could be affected by more than one project and could be vulnerable to increased sedimentation. The permanent effects to water resources from the proposed Project would likely include a local reduction of infiltration from the placement of turbine towers.

Cumulative Effects on Water Resources from Reasonably Foreseeable Future Actions including the Proposed Action and Alternatives
Ongoing agricultural activities, livestock grazing, development, road maintenance and the presence of hydroelectric dams and other ongoing land uses and practices are expected to continue within the Project area in the future.

Reasonably foreseeable actions with the potential to impact water resources from disturbance, sedimentation, vegetation removal, and water quality degradation consist of the proposed Saddle Mountain West Wind Farm Project. The cumulative effects to water resources from the proposed Project in combination with the effects of the Saddle Mountain West Wind Farm project would be concentrated in the Esquatzel Coulee, Lower Yakima and Lower Crab Creek WRIAs. The greatest effects would occur in the Lower Crab Creek and Esquatzel Coulee WRIAs. Increases in impervious surfaces could increase surface water runoff and, therefore, downstream flooding potential. However, impervious surface impacts from the wind project would likely be low.

It is expected that the proposed Project will not substantially contribute to cumulative impacts given the scale and extent of the impacts created by past, present and reasonably foreseeable projects. The proposed Project, expected to permanently disturb approximately 80 acres and temporarily disturb approximately 250 acres, represents a fraction of cumulative project disturbances. Fifteen other major existing transmission lines are located within the overall cumulative effects spatial boundaries of the proposed Project, with each project affecting a much greater area within this boundary, perhaps thousands of acres. It is assumed that the total disturbance for the Saddle Mountains West Wind Farm might be as much as 675 acres or more. This represents a relatively large geographical area impact and disturbance area compared to the Vantage-Pomona Heights Transmission Line Project, which is a linear facility with widely-spaced disturbance primarily associated with structure placement. Added to the affects of wide-spread agricultural, urban and military land conversion, the effects of flooding, reduction of groundwater recharge, and other water impacts would cause low and insignificant cumulative effects.

Soils and Geology

Geographic Scope and Timeframe of Analysis
The geographic scope of the cumulative effects analysis for soil and geologic resources includes the portion of the Columbia Plateau physiographic province that occurs within the Project area. The timeframe for the analysis extends from the historical past when Euro-American settlers began to alter soil and geologic resources in the vicinity of the cumulative effects area by actions such as farming and livestock grazing, and extends into the future to include the 50-year operational life of the proposed Project.

Existing Soils and Geology and How it Has Been Affected by Past and Present Actions
Past and present actions that have affected soils in the Project area and resulted in soil disturbance, compaction, and erosion include agricultural activities; highway and railroad construction; construction of existing transmission lines and substations; and residential and commercial development. Present activities that continue to affect soils include agricultural land uses, primarily crop production and livestock grazing and military training activities.

Effects of Reasonable Foreseeable Future Actions on Soils and Geology without the Proposed Action
Reasonably foreseeable actions with the potential to impact soils from disturbance, compaction and erosion consist of the proposed Saddle Mountain West Wind Farm Project. The Project area is located in the Columbia Plateaus physiographic province. The geology of the Project area consists of interbedded volcanic and sedimentary rocks of the Columba River Basalt Group. The effects to geology and soils caused by this project would likely be similar to the effects described for the proposed Project because it is located in a similar environment with similar soil and geological characteristics.

Cumulative Effects on Soils and Geology from Reasonably Foreseeable Futures Actions including the Proposed Action and Alternatives
The proposed Project would result in short-term disturbance to soils associated with auguring of new holes and direct burial and backfill for transmission structure construction and the improvement of existing access roads and construction of new access and spur roads. The effects from construction of the proposed Project and the Saddle Mountain West Wind Farm project would be localized and limited to the construction footprints. Additionally, soil erosion associated with construction of the proposed wind energy project would largely be mitigated by implementation of Best Management Practices (BMPs) during and following construction. The effects of soil erosion, soil productivity and other soil resource impacts from the reasonably foreseeable projects and the proposed Project will be low and insignificant.

Public Health and Safety and Noise

Geographic Scope and Timeframe of Analysis
The geographic scope of the cumulative effects analysis for public health and safety and noise includes the area in the vicinity of the route alternatives and more broadly the four counties that would be crossed by the route alternatives (Yakima, Grant and small portions of Kittitas and Benton counties) to include a larger extent of the landscape encompassing the identified reasonably foreseeable future actions.

The timeframe for the analysis extends from the historical past when Euro-American settlers began to alter noise conditions in the area by actions such as farming and livestock grazing, and extends into the future to include the 50-year operational life of the proposed Project.

Existing Public Health and Safety and Noise and How it Has Been Affected by Past and Present Actions
Implementation of past and present actions in the Project area have generally not resulted in lasting noise effects and the Project area continues to enjoy relatively low noise levels on a continual basis. Past actions that have increased noise levels include construction of Priest Rapids and Wanapum dams, agricultural activities, highway and railroad construction, JBLM YTC military operations, construction and operation of the numerous high voltage transmission lines and substations in the Project area. Present and ongoing activities that cause noise in the Project area include agricultural activities, ongoing road maintenance projects, operation of the existing transmission lines and military training activities.

Effects of Reasonable Foreseeable Future Actions on Public Health and Safety and Noise without the Proposed Action
Reasonably foreseeable future actions in the Project area and vicinity that could increase noise levels include ongoing agricultural activities, ongoing road maintenance activities, JBLM YTC military operations, operation of existing transmission lines and substations and the development of wind energy facilities and associated power transmission infrastructure. Cumulative noise impacts in the Project area typically occur when noise receptors are exposed to noise from sources at approximately the same time, such as from vehicles and agricultural equipment operation and in the future from turbine noise from wind energy facility operation.

There could be cumulative noise impacts if these actions are undertaken simultaneously and in relatively close proximity to each other. However, it is expected that these actions would not result in cumulative noise impacts due to spatial and temporal separation.

Cumulative Effects on Public Health and Safety and Noise from Reasonably Foreseeable Futures Actions including the Proposed Action and Alternatives
Reasonably foreseeable future actions in the Project area and vicinity that could increase noise levels include ongoing agricultural activities; ongoing road maintenance activities; JBLM YTC military operations; operation of existing transmission lines and substations; and the development of wind energy facilities and associated power transmission infrastructure.

The construction of the proposed Project and the proposed wind energy project would not result in cumulative impacts on noise levels.

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4.18 RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY

The Council on Environmental Quality (CEQ) National Environmental Policy Act (NEPA) Regulations (40 Code of Federal regulations [C.F.R.] 1500-1508) require that an Environmental Impact Statement (EIS) discuss "the environmental impacts of the alternatives, any adverse environmental effects which cannot be avoided should the proposal be implemented, the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity and any irretrievable commitments or resources which would be involved in the proposal should it be implemented" (40 C.F.R. 1502.16).

Short-term is defined as the total duration of the associated construction activities of the Project, whereas long-term is defined as an indefinite period beyond the construction of the Project and associated facilities. The specific effects of implementing the proposed Project vary in type, intensity, and duration according to the activities occurring at any given time. Implementation of any of the action alternatives involves tradeoffs between long-term productivity and short-term uses of the environment.

Construction of any of the action alternatives would result in a number of temporary effects that would cease upon completion of the construction phase. Short-term impacts associated with each resource are analyzed in Chapter 4 Sections 4.2 through 4.15. Examples of short-term impacts include temporary air emissions; temporary noise from construction equipment operation; temporary disruptions to existing land uses; temporary construction related road or lane closures; increased traffic from construction vehicles; and potential for soil erosion from access road construction. Environmental impacts during construction would be relatively short-term (9 to 12 months) and would be mitigated by project design features, best management practices (BMPs) and stipulations.

The transmission line may exist for decades and longer. Many of the effects discussed in the Chapter 4 Environmental Consequences sections are considered to be short-term (occurring only during construction activities). Longer term impacts over the operational life of the Project could occur. Examples of long-term impacts would include permanent changes in land use where the transmission is constructed, and creation of deviations from the existing visual landscape character in areas where transmission lines do not currently exist.

The proposed Project could also result in both short-term and long-term benefits for the local and regional economies in Yakima and Grant counties. These benefits include the creation of new jobs, and increase regional income, sales and income tax revenues, property tax revenues and right-of-way rental receipts to the federal government.

In general, the proposed Project will not result in impacts that would significantly alter the long-term productivity of the affected environment. For example, soils and vegetation within the affected environment that were disturbed during the construction of the many existing high voltage transmission lines in the Project area have largely recovered. While there is never complete recovery, long-term productivity of the affected environment has not been significantly altered by the construction of the existing transmission lines and revegetation and crop production continues to occur. A similar productivity recovery outcome following construction of the proposed Project is expected to occur.

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4.19 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

In accordance with National Environmental Policy Act (NEPA) Regulations (40 Code of Federal Regulations [C.F.R.] 1500-1508), this section addresses irreversible and irretrievable commitment of resources that would result from the implementation of the proposed Project.

Resources committed to the proposed Project would be material and non-material. Irreversible commitment of resources for the purposes of this section has been interpreted to mean that those resources, once committed to the proposed Project, would continue to be committed throughout the 50 year life of the Project. Irretrievable commitment of resources has been interpreted to mean that those resources used, consumed, destroyed, or degraded during construction, operation, and maintenance of the proposed Project could not be retrieved or replaced for the life of the Project or beyond.

Implementation of the proposed Project would require the consumption of nonrenewable fuel (diesel, gasoline, and jet fuel) resources for construction vehicles, construction equipment, construction operation vehicles, and helicopter use. Construction of the Project would result in the consumption saleable minerals, including fill material for grade changes, sand and gravel for concrete production, gravel for road beds, and similar use resulting in an irretrievable commitment of natural resources. Construction would also require the manufacture of new materials, some of which would not be recyclable at the end of the Project's lifetime, and energy for the production of these materials, which would also result in an irretrievable commitment of natural resources. Irreversible and irretrievable commitments of resources and environmental changes for the Project are summarized in Table 4.19-1.

TABLE 4.19-1 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

RESOURCE TYPE	TYPE OF COMMITMENT/CHANGE REASON FOR COMMITMENT/CHANGE	IRREVERSIBLE	IRRETRIEVABLE
Climate and Air Quality	Degradation of air quality *Construction activities*	No	No
Noise	None	-	-
Land Use	Exclusion of other uses *Construction and operation*	No	Yes
Agriculture	Exclusion of other uses *Construction and operation*	No	Yes
Recreation	Impacts to recreational facilities and trails *Construction and operation*	No	Yes
Public Services/Utilities	None	-	-
Hazardous Waste/Materials	None	-	-
Traffic and Transportation	Use of local transportation infrastructure	No	No
Visual Resources	Adverse affects to visual resources of the area *Construction and operation*	No	Yes
Cultural Resources	Disturbance or removal of historical, cultural and/or archaeological resources *Construction and operation*	Yes	Yes
Wildfire and Fuels	Impacts to fire suppression efforts *Construction and operation*	No	Yes
Electrical Effects	None	-	-
Social and Economic Conditions	None	-	-
Biological Resources	Disturbance to and loss of vegetation and wildlife Degradation and loss of habitat *Construction and operation*	Yes	Yes
Earth Resources: Soils	Soil loss and erosion *Construction activities*	Yes	Yes
Earth Resources: Mineral Resources	Raw materials *Construction activities*	No	Yes
Water Resources	Impacts to drainages, wetlands, Waters of the State, Waters of the U.S. *Construction activities*	No	No

4.20 INTENTIONAL DESTRUCTIVE ACTS

Intentional destructive acts, such as acts of sabotage, terrorism, vandalism, and theft, can occasionally occur at power utility facilities. Acts of sabotage or terrorism on electrical facilities in the Pacific Northwest are rare. When they occur, these acts are generally focused on attempts to destroy large transmission line steel towers.

Vandalism and thefts at electrical facilities are the most common intentional destructive acts. Recent increases in the price of metal and other materials have resulted in increased thefts at electrical facilities. Pacific Power has seen an increase in metal theft from its facilities over the past few years when the price of metal is high on the salvage market. There were more than seven burglaries at Pacific Power substations in 2012. The conservative estimate of damages for these crimes is $9,000, but the actual amount is likely much higher since this number does not factor in all the labor-related costs associated with repairing the damage. Stealing equipment from electrical substations can be extremely dangerous. Throughout the nation, thieves have been electrocuted while attempting to steal equipment from energized facilities; however, no deaths associated with thefts have occurred at Pacific Power facilities.

To prevent theft, vandalism, and unauthorized access to facilities, all Pacific Power electrical facilities are secured with fencing and warning signs, with sites that are classified as critical receiving additional measures. In addition, a reward program is initiated by Pacific Power to respond to heightened theft activity, when deemed necessary.

Depending on the size and voltage of the line, destroying towers or other equipment could cause electrical service to be disrupted to utility customers and end-users. The effects of these acts would be varied and would depend on the configuration of the transmission system in the area. In some circumstances, these acts would have no noticeable effect on electrical service; however, in other situations, service could be disrupted in the local area, or if the damaged equipment was part of the main transmission system, a much larger area could be impacted.

When a loss of electricity occurs, all services provided by electrical energy cease. Services lost to residential, commercial, industrial and municipal customers could include: lighting; heat; electricity for cooking; loss of ventilation; the stopping of mechanical drives causing impacts to elevators, food preparation machines, appliances for cleaning, hygiene, and grooming, office equipment, heavy equipment, and fuel pumps. In addition, if traffic signals fail to operate, roadways could experience gridlock and mass transit dependent upon electricity, such as light rail systems, could be impacted. Sewage transportation and treatment can be disrupted.

Overhead transmission conductors and the towers that carry them are mostly on unfenced utility rights-of-way. All new equipment associated with the proposed Project would be installed within existing fencing at both the Pacific Power Pomona Heights substation and the existing Bonneville Power Administration (BPA) Vantage substation sites.

While the likelihood for sabotage or terrorist acts on the proposed Project is difficult to predict, it is unlikely that such acts would occur. If such an act did occur, the problem area would be isolated quickly and electricity rerouted as much as possible to keep the system functioning. The Department of Energy, public and private utilities, and energy resource developers use security measures to help prevent such acts and to respond quickly if human or natural disasters occur.

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CHAPTER 5 CONSULTATION AND COORDINATION

5.1 INTRODUCTION

This chapter summarizes public and agency involvement activities undertaken by the U.S. Bureau of Land Management (BLM). These activities have been conducted for the Vantage to Pomona Heights 230 kilovolt (kV) Transmission Line Project in order to satisfy the National Environmental Policy Act (NEPA) requirements for public scoping and agency consultation and coordination. Federal agencies preparing an Environmental Impact Statement (EIS) must "make diligent efforts to involve the public in preparing and implementing their [NEPA] procedures" (40 Code of Federal Regulations [C.F.R.] 1506.6 (a)). Council on Environmental Quality (CEQ) regulations provide guidance on the scoping process, including inviting participation of affected federal state and local agencies, Native American Tribes, as well as any other interested parties (40 C.F.R. 1517.7 (a) (1)).

Consistent with NEPA procedures, public participation and agency consultation for this Project have been accomplished through issuance of public notices, public scoping meetings, and formal and informal consultation with agencies, stakeholders, landowners and Native American Tribes. The consultation and coordination process helped determine the scope of this EIS; identify the range of alternatives; and define issues of importance and potential environmental impacts to be addressed in the EIS. The Project Team will continue to solicit public and agency input on the Project by encouraging review of this EIS.

5.2 SCOPING PROCESS

Scoping is an early and open process for determining the scope of issues to be addressed in the EIS and for identifying the significant issues related to the proposed action by seeking comments from interested and potentially affected parties, including landowners, citizens, tribes, government agencies, and interest groups and organizations (40 C.F.R. 1501.7). The intent of scoping is to focus the analysis on significant issues and reasonable alternatives, to eliminate extraneous discussion, and to reduce the length of the EIS. Scoping occurs early in the NEPA process and generally extends through the development of alternatives.

5.2.1 Notice of Intent

Publishing the Notice of Intent (NOI) in the *Federal Register* begins the formal scoping process and serves as the official legal notice that the BLM is commencing an EIS. To comply with NEPA 40 C.F.R. 1508.22, on January 5, 2010, the BLM published an NOI to prepare an EIS for the Vantage to Pomona Heights 230 kV Transmission Line Project in the *Federal Register*, Volume 75, Number 175. The *Federal Register* is the official federal daily publication for rules, proposed rules and notices of federal agencies and organizations.

The NOI initiated the public scoping period for the EIS and described the Vantage to Pomona Heights 230 kV Transmission Line Project, alternatives and the environmental review process. It also identified preliminary issues and concerns and contacts. The NOI served as an invitation to provide comments on the proposed Project and the scope and content of the EIS. The comment period began on January 5, 2010 with a request that all comments be received by March 8, 2010.

5.2.2 Public and Agency Notification Letters

In addition to the *Federal Register* notice, the BLM sent letters notifying landowners within 0.25 mile on either side of assumed centerlines of the preliminary alternative routes of the Project, of the intent to prepare an EIS, the dates, location and time of the public scoping meetings, and ways to provide comments and when the comments were due (March 8, 2010).

Dear Interested Party letters were also sent to other interested individuals, groups, organizations and Native American Tribes on a mailing list developed by the BLM. In addition, letters were sent to federal, state and local agencies and elected officials notifying them of the Project, the intent to prepare an EIS, the scoping period, and an invitation to attend an agency scoping meeting. A total of 1,280 Dear Interested Party and Agency notification letters were sent on January 14, 2010. The notification packet included the letter and a map showing the preliminary route alternatives under consideration.

The following is a breakdown of the distribution of the public, agency and Native American tribal government notification letters:

- 117 Agencies (51 federal, 36 state, 18 county, 12 city/local)
- 11 Native American Tribes
- 22 Elected Officials
- 50 Organizations
- 19 Schools/Libraries
- 158 Individuals
- 903 Landowners

5.2.3 News Release and Paid Announcements

The BLM issued a news release to the local media and posted it on the BLM website on January 8, 2010 announcing the Project, public scoping meetings, and requesting comments. In addition to the BLM news release, paid advertisements were placed in the newspapers listed below announcing the public scoping meetings.

Selah Public Scoping Meeting

- Yakima Herald Republic – January 27, 2010 and January 31, 2010
- Selah Independent – January 27, 2010
- Ellensburg Daily Record – January 27, 2010

Mattawa Public Scoping Meeting

- Sunnyside Daily News – January 27, 2010
- The Columbia Basin Herald – January 27, 2010
- The Othello Outlook – January 28, 2010
- South County Sun – January 27, 2010
- Independent Review – February 3, 2010
- Mattawa Area News – February 3, 2010

5.2.4 Website and Comment Methods

The BLM posted information on the project Web site at: http://www.blm.gov/or/districts/spokane/plans/vph230.php consisting of a Project description, announcement of public open houses, how to submit comments, point of contact for more information, preliminary Project map, official NOI, and Letter to Interested Parties.

The BLM and the Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) invited comments through a variety of methods, including:

- Comments submitted by email

- Comment forms collected at public scoping meetings
- Comments submitted at GIS workstations at public scoping meetings
- Comments by mail or fax
- Written and verbal comments recorded by BLM, JBLM YTC and contractor staff at the public scoping meetings

Comments were accepted through March 8, 2010.

5.2.5 Scoping Meetings

The BLM held two open house style public scoping meetings on consecutive evenings from 6 p.m. to 8 p.m. and one round table agency scoping meeting from 1:30 p.m. to 3:30 p.m. at the locations and dates listed in Table 5-1.

TABLE 5-1 SCOPING MEETING DATES AND LOCATIONS

MEETING DATE	MEETING LOCATION	MEETING ATTENDANCE*
February 3, 2010 Public Scoping Meeting	Selah Civic Center, Selah, WA	71
February 4, 2010 Public Scoping Meeting	Mattawa Elementary School Cafeteria, Mattawa, WA	23
February 3, 2010 Agency Scoping Meeting	Selah Civic Center, Selah, WA	-Washington Dept of Fish and Wildlife -Washington Department of Transportation -U.S. Fish and Wildlife Service -Kittitas County -Yakama Nation

*This column reflects the number of people who signed the meeting sign-in sheet form. Some members of the public declined to sign the form.

5.2.6 Second Dear Interested Party Letter and Comment Period

During 2010, there were numerous changes to the route alternatives presented for comment during the formal scoping period (January 5, 2010 through March 8, 2010). As a result of the changes to the route alternatives, the BLM prepared and distributed a second Dear Interested Party Letter on January 14, 2011. The mailing list was updated to include new interested parties and landowners potentially affected by the new route alternatives.

The purpose of the letter was to provide agencies, Native American Tribes, landowners, and other organizations an update on the EIS process and schedule, as well as to present changes to the route alternatives for review and comment. Comments on the revised route alternatives were accepted through February 4, 2011. No additional public meetings were held during this second comment period. A total of 1,019 Dear Interested Party letters were sent on January 14, 2011.

The following is a breakdown of the distribution of the notification letter:

- 100 Agencies (35 federal, 38 state, 17 county, 10 city/local)
- 15 Native American Tribes
- 27 Elected Officials
- 16 Organizations
- 12 Schools/Libraries
- 150 Individuals

- 699 Landowners

5.2.7 Issues, Concerns and Comments

Issues, concerns and comments received from the January 5, 2010 to March 8, 2010 scoping period and the second comment period, January 14, 2011 to February 4, 2011 are summarized in Chapter 1, Section 1.10 Issues Identified. A detailed summary of issues, concerns and comments, as well as copies of comment letters received is contained in the February 2011, *Vantage to Pomona Heights 230 kV Transmission Line Project EIS Scoping Report.* The full report is available for inspection and review at the BLM Wenatchee Field Office.

5.3 CONSULTATION AND COORDINATION

Agencies, Native American Tribes, organizations and individuals having jurisdiction, special expertise and/or specific interest in the Project were contacted during the scoping process, during the resource inventory and surveys and prior to the publication of the EIS to inform them of the Project, to verify the status and availability of existing environmental data, to request data and comments, and to solicit input about the Project. This section describes the consultation and coordination activities that occurred throughout the EIS process.

5.3.1 Cooperating Agencies

The CEQ regulations implementing NEPA encourage the lead federal agency to invite other federal, state, tribal or local agencies with jurisdiction by law or special expertise with respect to environmental issues addressed in the analysis to serve as cooperating agencies in the preparation of the EIS (40 C.F.R. 1508).

The BLM is the lead federal agency for NEPA compliance and preparation of the EIS. There are six Cooperating Agencies.

A summary of each Cooperating Agency's interests and responsibilities with respect to the proposed Project is provided below.

- **U.S. Army Joint Base Lewis-McChord Yakima Training Center (JBLM YTC):** The JBLM YTC is a formal Cooperating Agency responsible for processing Pacific Power's application for a right-of-way (ROW) on federal lands managed by the U.S. Department of the Army.

- **Bonneville Power Administration (BPA):** BPA is a formal Cooperating Agency because it owns and operates the existing Vantage Substation to which Pacific Power is proposing to interconnect its proposed transmission line. BPA will need to decide whether to grant Pacific Power's request for this interconnection.

- **U.S. Bureau of Reclamation (Reclamation):** Reclamation is a formal Cooperating Agency responsible for processing Pacific Power's ROW application (SF 299) filed on April 17, 2011 requesting a grant of ROW across federal lands managed by Reclamation.

- **Yakima County:** Yakima County is a formal Cooperating Agency because of its responsibility under county code to review the proposed transmission line project which is subject to a Type II Land Use review. For the county to make a decision regarding the issuance of a Type II Administrative Permit, it is necessary for the project to comply with the Washington State Environmental Policy Act (SEPA). Yakima County may choose to adopt this EIS to satisfy SEPA requirements.

- **Grant County:** Grant County is a formal Cooperating Agency. Grant County has a coordinating ordinance (Chapter 21.04 Coordinating Government Regulation of Land and Natural Resource Use) which establishes as county law the basis and process for determining how federal and state agencies are to coordinate and consult with Grant County in actions affecting land and natural resource use within the county.

  A section of the Grant County Unified Development Code (Chapter 25.08) which historically regulated electrical transmission lines exceeding 115 kV as a major utility development and subject to land use and environmental review and a Conditional Use Permit was eliminated through amendment to the county code by the Board of County Commissioners in July 2011.

  However, the Grant County Building Code does not exempt private regulated utilities, like Pacific Power from a requirement to obtain a building permit from the county. The building permit is considered a "Project Permit" and as such SEPA review is required (D. Hooper, Personal Communication, July 2011). The building permit is an administrative permit; no Planning and Zoning or Board of County Commission approval is required. Grant County may choose to adopt this EIS to satisfy SEPA requirements.

Conference calls of the Project Core Team, consisting of the BLM, cooperating agencies, Pacific Power and the third party EIS contractor were held twice each month during the preparation of the EIS to discuss the status of EIS preparation and to coordinate information exchange and other pertinent decisions related to analysis of alternatives and preparation of the EIS.

5.3.2 Tribal Consultation

Various federal statutes and regulations, including NEPA and the National Historic Preservation Act (NHPA), require that agencies consult with Native American Tribes. Also, Executive Order 13175, *Consultation and Coordination with Indian Tribal Governments,* issued in 2000, directs federal agencies to establish regular and meaningful consultation and collaboration with Tribal officials in the development of federal policies that have Tribal implications, to strengthen the United States government-to-government relationships with Indian Tribes, and to reduce the imposition of unfunded mandates upon Indian tribes.

Regulations for Section 106 of the NHPA require that federal agencies identify potentially affected Indian Tribes that might have knowledge of sites of religious and cultural significance in the area of potential effects (APE; 36 C.F.R. 800.3(f)(2)). If any such properties exist, the regulations require that federal agencies invite Indian tribes to participate in the Section 106 process as consulted parties. For the Vantage to Pomona Heights 230 kV Transmission Line Project, the BLM is responsible for Section 106 consultation with Native American Tribes that could potentially have interest in or who have traditional ties to the Project area. As required by the NHPA (36 C.F.R. 800.2(c)(2); 36 C.F.R. 800.3(f)(2); 36 C.F.R. 800.14(b)(2); and 36 C.F.R. 800.14(f)). The BLM has consulted the federally recognized Confederated Tribes and Bands of the Yakama Nation and the Colville Confederated Tribes. The BLM has also consulted with the non-federally recognized Wanapum Band of Indians.

Tribal consultation to date has consisted of:

- Visit to project vicinity by JBLM YTC and Yakama Nation Cultural Resource Program representatives on January 12, 2010.

- The public scoping letter for the Vantage to Pomona Heights Transmission Line Project was sent to the tribes and tribal organizations on January 14, 2010.

- Information meeting at Yakima Training Center on January 19, 2010 with Yakama representatives (Johnson Meninick, Dave Woody, Gideon Cauffman, Randell Squeochs), JBLM YTC (Randy Korgel), and Pacific Power (John Aniello).

- Letter from Wanapum Band of Indians to JBLM YTC on October 19, 2010 stating the Wanapum do not support any of the proposed route alternatives identified at that time.

- Second letter from Wanapum Band of Indians to JBLM YTC on October 19, 2010 stating the Wanapum do not support a route alternative along the abandoned railroad ROW (Route Segment 3b).

- Letter from Confederated Tribes and Bands of the Yakama Nation on October 27, 2010 to JBLM YTC requesting consultation and expressing that the proposed Project will have an adverse effect on cultural resources and that the Yakama Nation is not in support of proposed alternatives.

- Information meeting at Yakima Training Center on December 9, 2010 with Yakama and Wanapum Tribal representatives and BLM, JBLM YTC, Pacific Power, POWER Engineers and Grant County Public Utility District (PUD) representatives.

- During 2010, there were numerous changes to route alternatives. As a result of the changes to the route alternatives, the BLM prepared and sent a second scoping letter to interested parties and the tribes and tribal organizations on January 14, 2011.

- Meeting with Yakama Cultural Committee and Wanapum at Yakama Agency main Offices, Toppenish, Washington on January 27, 2011, attended by Yakama Tribal Council members, and representatives of JBLM YTC, Pacific Power, POWER Engineers, BLM and Grant County PUD.

- Meeting on March 1, 2011 in Ellensburg, Washington to discuss various aspects of NEPA and Section 106 processes, attended by cultural resource staff from BLM, JBLM YTC, POWER Engineers, and Yakama Nation.

- As part of government-to-government consultation, Native American consultation letters were sent out by the BLM on March 21, 2011 to the Yakama Nation, Wanapum Band of Indians and the Confederated Tribes of the Colville Reservation.

- Resolution from Yakama Nation Road, Irrigation and Land Committee (CA# 102 2011-5) dated March 21, 2011 rejecting the route segment along the abandoned railroad ROW (Route Segment 3b), with particular concern about proximity to Priest Rapids longhouse and sweat lodge.

- Resolutions from Yakama Nation Tribal Council Lands Committee and Culture Committee (CA# 048 2010-10 and CA# 102 2011-5) dated March 21, 2011 rejecting the route segment along the abandoned railroad right-of-way (Route Segment 3b).

- Resolution from the Yakama Nation Tribal Council Cultural Committee (CA# 019 2012-10) approved support of Route Segment 3c as long as full avoidance of archaeological sites can be achieved.

- Preferred Route Selection Workshop held in Yakima, Washington on May 17, 2012. The Workshop included 40 participants from the BLM (lead agency), JBLM YTC (cooperator), BPA (cooperator); Reclamation (cooperator), WDFW (cooperator), Yakima County (cooperator), Grant County (cooperator), Pacific Power (proponent), POWER Engineers, Inc. (third-party EIS contractor), and representatives from the Confederated Tribes and Bands of the Yakama Nation and Wanapum Band of Indians. During this meeting, the Yakama Nation and the Wanapum Band of Indians expressed concern for cultural resources and requested surveys be conducted for all route segments. Refer to Chapter 2 (Section 2.8) for more information on the Preferred Route Selection Workshop.

- The Confederated Tribes and Bands of the Yakama Nation and Wanapum Band of Indians were notified on May 25, 2012 of plans to develop a Programmatic Agreement (PA) to address Section 106 review including cultural resources inventory, evaluation, and measures to address adverse effects.

- Letter from BLM to the Yakama Nation and the Wanapum Band of Indians dated June 22, 2012 inviting them to become a formal cooperating agency for the proposed Project.

As an outgrowth of the consultation process Pacific Power funded a study of Traditional Cultural Properties (TCPs) in the project vicinity. The Yakama Nation Cultural Resource Program in collaboration with the Wanapum prepared a TCP report (Lally and Camuso 2011) identifying sites and issues of concern regarding project alternatives. The TCP study was performed under the direction of the BLM.

5.3.3 Biological Resources

Under the provisions of Section 7(a) (2) of the Endangered Species Act (ESA), a federal agency that carries out, permits, licenses, and funds or otherwise authorizes an activity must consult with the U.S. Fish and Wildlife Service (USFWS) as appropriate, to ensure the action is not likely to jeopardize the continued existence of any species listed as threatened or endangered. In accordance with these regulations, the BLM initiated informal consultation with the USFWS in 2010. On March 1, 2011, the USFWS attended an interagency meeting with resource specialists and representatives from the BLM, WDFW, JBLM YTC, Yakama Nation, Reclamation, Grant County, Kittitas County, Washington Department of Natural Resources, Washington Department of Transportation, Pacific Power and the EIS contractor, POWER Engineers.

To fulfill the NEPA requirements for the evaluation and determination of potential impacts to biological resources and special status species and to comply with Section 7 of the ESA, Migratory Bird Treaty Act (MBTA), Bald and Golden Eagle Protection Act, SEPA, BLM and other county and state permits, a list of special status species was compiled. These species were identified from the federal threatened, endangered and candidate species list for each county located with the Project area, state of Washington listed species, the BLM sensitive species list and JBLM YTC sensitive species. The species list also included other sensitive species protected under the Bald and Golden Eagle Protection Act and/or MBTA and game species that may occur within the Project area. In addition special status plant species were identified by compiling a list of all special status species known to the counties (Benton, Grant, Kittitas, and Yakima), data accessed from the Washington Natural Heritage Program and BLM. The list was further refined with special status species from the USFWS; federally threatened, endangered and species of concern; Washington State threatened and endangered species, Inter-agency Special Status/Sensitive Species Program species and JBLM YTC. Wildlife special status species are discussed in Section 3.3 and plant special status species are discussed in Section 3.2.

Four federally list wildlife species were identified as likely to occur within the Project area, including one threatened, one endangered and two candidate species. Five federally listed plant species were identified as likely to occur within the Project area. None of these plant species were located in the Special Status Plant surveys (Appendix B-3).

The National Oceanic and Atmospheric Administration National Marine Fisheries Service (NMFS) is consulted when a project's activities may affect a marine or anadromous fish or mammal species listed under the Endangered Species Act. For the proposed Project, no structures or road construction work would occur within the Columbia River or its tributaries. For the Columbia River crossing, the structures would be approximately 200 foot tall lattice steel structures for the up to 2,800 foot crossing. Erosion would be minimized by applying and maintaining standard erosion and sediment control methods. These may include straw waddles, straw bale barriers and silt fencing which would be placed at construction boundaries. Specific erosion and sediment control measures and locations would be specified in a Stormwater Pollution Prevention Plan (SWPPP). No identifiable impacts to federally listed fish or their habitat are anticipated to occur through construction, operation and maintenance of the proposed Project. It is anticipated that informal consultation with NMFS will be conducted.

5.3.4 Cultural Resources

Section 106 of the NHPA of 1966 (as amended), requires federal agencies to evaluate effects of federal undertakings on historical, archaeological, and cultural resources, and to consult with the State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP) concerning potential effects of federal actions on historic properties. Before federal funds are approved for a particular project or prior to the issuance of any permit, authorization, or license, the effect of the project on any district, site, building, structure, or object that is listed in or eligible for listing in the National Register must be evaluated.

As required by the federal regulations implementing the NHPA (36 C.F.R. 800), the BLM has consulted with the Washington SHPO (36 C.F.R. 800.3(c) (3)). On March 21, 2011, the BLM sent a letter to the SHPO requesting consultation for the Vantage to Pomona 230 kV Transmission Line Project, as well as concurrence of the APE as defined in 36 C.F.R. 800 16(d).

The BLM, JBLM YTC and the Washington SHPO are in the process of preparing a PA for the Project that would establish procedures for identifying historical, archaeological, and cultural resources; evaluating their eligibility to the National Register, assessing effects; and implementing measure to avoid or mitigate adverse effects. The ACHP was notified on March 1, 2011 of the undertaking, and notification of adverse effects and plans to develop a PA for the project was submitted on May 17, 2012. On June 16, 2012, the ACHP declined to participate in consultation to resolve adverse effects at this time.

A cultural resource study involving the collection of Class I data was conducted to identify and assess potential impacts the proposed Project may have on cultural resources and to support the evaluation of Project alternatives for the EIS. A detailed cultural resources technical report with detailed mapping of recorded sites and survey areas was prepared. In addition, a TCP study was conducted and a report was prepared by the Yakama Nation Cultural Resource Program in collaboration with the Wanapum. An intensive Class III inventory survey of the preferred route and a sample of route segments identified in the alternatives will be conducted. The survey will be conducted to specifically identify those cultural resources that occur within the Project's APE.

5.3.5 Agencies, Organizations or Individuals Consulted

The following agencies, organizations and stakeholders were consulted as part of the EIS process:

FEDERAL AGENCIES

U.S. Fish and Wildlife Service
- Central Washington Fish and Wildlife Office
- Central Washington Field Office Ecological Services

Bureau of Reclamation
- Pacific Northwest Region-Ephrata Field Office

Joint Base Lewis-McChord Yakima Training Center

U.S. Army Corps of Engineers
- Seattle District Regulatory Branch
- Eastern Washington Field Office
- Central Washington Field Office

Columbia National Wildlife Refuge

Hanford Reach National Monument

Department of Energy

Federal Aviation Administration
- Washington Division
- Northwest Mountain Division

U.S. Environmental Protection Agency
- Region 10

Federal Highway Administration
- Washington Division

Bonneville Power Administration

Advisory Council on Historic Preservation

STATE AGENCIES

Washington Department of Natural Resources
- Southeast Region
- Natural Heritage Program
- Rights of Way Program

Washington Department of Fish and Wildlife
- South-Central Regional Office

Washington Department of Ecology
- Central and Eastern Regional Offices

Washington State Department of Transportation
    South Central Region
    Aviation Division

Washington Department of Archaeology and Historic Preservation
    State Historic Preservation Office

Washington Army National Guard
    Camp Murray, WA

REGIONAL/LOCAL ENTITIES

Port of Mattawa

Yakima Regional Clean Air Agency

Grant County Public Utility District No.2

Desert Aire

Grant County Airport District No. 1

Western Electricity Coordinating Council

COUNTIES

Yakima County
    County Commission
    Public Services - Planning and Transportation
    Noxious Weed Control Board

Grant County
    County Commission
    Community Development-Planning Division
    Public Works Department
    Noxious Weed Control Board

Kittitas County
    County Commission
    Community Development Services
    Public Works Department
    Noxious Weed Control Board

Benton County
    Planning Department
    Public Works Department
    Noxious Weed Control Board

NATIVE AMERICAN TRIBES

Confederated Tribes and Bands of Yakama Nation

Wanapum Band of Indians

Confederated Tribes of the Colville Reservation

ORGANIZATIONS/STAKEHOLDERS

Pacific Northwest 4-Wheel Drive Association

Washington Association of Wine Grape Growers

Shaw Vineyards

Taylor Orchards

Ginkgo Forest Winery

Yakima Valley Audubon Society

Auvil Fruit Company

Burke Wahluke Enterprises

S Martinez Livestock, Inc.

Black Rock Ranch

Bassini Farms LLC

Coombs Ranch

Desert Aire Owners Association

Northern Fruit Company

Alton Family Trust

Drummers and Dreamers LLC

Double D Farms

Central Valley Helicopters

J. Eckenberg

J. Gallacci

Nathan Maughn

5.4 PUBLIC REVIEW OF THE EIS

In compliance with NEPA (40 C.F.R. 1506.6(b)(2)), a Notice of Availability (NOA) of the Draft EIS must be published in the Federal Register, thus beginning the public comment period. The Draft EIS is submitted to the U.S. Environmental Protection Agency (EPA) which is required to review all EISs. The EPA is also responsible for publishing the NOA after the Draft EIS is received (40 C.F.R. 1506.9, 1506.10).

The minimum public review period for a Draft EIS is 45 days from the date of publication of the NOA by the EPA, unless a longer period is required by individual agency regulation or process.

In accordance with NEPA requirements, this Draft EIS has been distributed for review and comment by agencies, interested organizations and individuals for a period of 45 days. All comments received from the Draft EIS review will be compiled, analyzed, summarized and responded to in the Final EIS.

The Draft EIS was posted to the BLM website; electronic copies were produced on CD-ROM for distribution. The Draft EIS has been distributed to agencies required to review the Draft EIS, and to other agencies, organizations and individuals that requested copies.

All written comments must be received 45 days after the Notice of Availability was published by the EPA in the *Federal Register.* Comments on the Draft EIS may be submitted in writing by letter or by e-mail to the BLM (as instructed in the letter to reviewers at the beginning of this document).

Following consideration of the comments received during the Draft EIS comment period, a Final EIS will be prepared and circulated per NEPA requirements and will include responses to all comments. The BLM will use the Final EIS when considering approval of the proposed Project. The BLM will issue a Record of Decision (ROD) to document that decision.

CHAPTER 6 LIST OF PREPARERS AND CONTRIBUTORS

Preparers and contributors involved throughout the Project, including Bureau of Land Management (BLM) and cooperating agency staff, consultants, and Project proponent are presented in Tables 6-1, 6-2, and 6-3.

TABLE 6-1 LEAD AND COOPERATING AGENCY PREPARERS AND CONTRIBUTORS

AGENCY		
NAME	**TITLE**	**INVOLVEMENT**
Bureau of Land Management (BLM) (Lead Agency)		
Richard Bailey	Spokane District Archaeologist	Cultural Resources, Programmatic Agreement Section 106 Compliance
Paula Brooks	Botanist	Botanical Resources, Sensitive Species, Threatened and Endangered Species, Invasive Species and Noxious Weeds
Molly Boyter	Botanist	Botanical Resources, Sensitive Species, Threatened and Endangered Species, Invasive Species and Noxious Weeds
Molly Cobbs	Planning and Environmental Coordinator	NEPA and Land Use Planning Compliance
Brent Cunderla	Geologist	Geology Resources
Elizabeth Earp	Physical Scientist	Soil, Water and Air Resources, Hazardous Materials
Karen Kelleher	Wenatchee Field Office Manager	Project Management and Local Government Coordination
Angela Link	Range Management	Livestock Grazing and Range Resources
Jamie Litzkow	Archaeologist	Cultural Resources, Programmatic Agreement Section 106 Compliance
Scott Pavey	Spokane District Planning and Environmental Coordinator	NEPA and Land Use Planning Compliance
Diane Preibe	Recreation Planner	Recreation, Special Management Areas and Visual Resources
Anya Rardin	Archaeologist	Cultural Resources, Programmatic Agreement Section 106 Compliance
Bill Schurger	Realty Specialist/ BLM Project Manager	Realty Issues, Land Use and Transportation
Steve Smith	Spokane District Recreation Planner	Recreation and Visual Resources
J.A. Vacca	Wildlife Biologist	Wildlife, Sensitive Species, and Threatened and Endangered Species

AGENCY		
NAME	**TITLE**	**INVOLVEMENT**
Joint Base Lewis-McChord Yakima Training Center (JBLM YTC) (Cooperating Agency)		
Jay Becker	NEPA Coordinator (Contractor)	NEPA Compliance, JBLM YTC, Document Review
Steve Kruger	Director Public Works	JBLM YTC, YTC Route Alternatives, Document Review
Randy Korgel	Archaeologist	Cultural Resources, JBLM YTC, Document Review
Colin Leingang	Wildlife Biologist	Wildlife, Sensitive Species, and Threatened and Endangered Species
Pete Nissen	Natural Resource Manager	JBLM YTC, YTC Route Alternatives, Document Review
Margaret Taaffe	Chief Environmental Division	JBLM YTC, Document Review
Bonneville Power Administration (BPA) (Cooperating Agency)		
Hannah Dondy-Kaplan	Environmental Protection Specialist	BPA, Document Review
Makary Hutson	Biological Scientist	BPA Transmission Lines, Previous BPA Cultural Survey Info, Document Review
Bureau of Reclamation (Reclamation) (Cooperating Agency)		
Bruce Loranger	Land Resource and Environmental Supervisor	Reclamation, Document Review
Warren Hurley	Archaeologist	Reclamation, Cultural Resources
Yakima County (Cooperating Agency)		
Steve Erickson	Planning Director	Yakima County, Document Review
Tommy Carroll	Public Service Project Planner	Document Review, Yakima County Siting Ordinance Information
Grant County (Cooperating Agency)		
Damien Hooper	Planning Manager	Grant County, Document Review

TABLE 6-2 CONTRACTOR AND SUBCONTRACTOR PREPARERS AND CONTRIBUTORS

EIS CONTRACTOR POWER ENGINEERS		
NAME	**EDUCATION**	**INVOLVEMENT**
John Everingham	M.S. Systems Ecology B.S. Environmental Science B.A. Political Science	Project Manager, Public Involvement
Darrin Gilbert	MLA Landscape Architecture BLA Landscape Architecture AS Architectural Technology	Project Coordination , Visual, Land Use, Transportation, Recreation, Special Management Areas, Climate, Air Quality
Dave Dean	M.S. Biology B.S. Biology	Biology Surveys Management, Wildlife Biology, Vegetation
Jim Rudolph	PhD Anthropology MA Anthropology B.A. Anthropology	Cultural Resources, Programmatic Agreement
Cindy Lysne	M.S. Biology B.S. Biology	Vegetation, Noxious Weeds, Wildlife, Wildland Fire Ecology
Andy Bartos	B.S. Wildlife Management	GIS Analyst
Ben Bainbridge	M.S. Zoology B.S. Biology	Sage Grouse Surveys
Kurt Bell	M.S. Electrical Engineering B.S. Electrical and Computer Engineering	Electric and Magnetic Fields, Noise
Stephanie Bennett	B.S. Broadcast Journalism	Public Involvement
Josh Brown	B.S. Electrical Engineering	Electric and Magnetic Fields
Kirsten Severud	B.A .Geography	GIS Analyst
Sarah Doering	M.S. Biology B.A. Environmental Biology, Botany Minor	GIS Analyst
Beth Colket	M.S. Rangeland Ecology and Management BAIS Biology and Spanish	Habitat Assessment Special Status Plants and Noxious Weeds Surveys
Holly Cunha	B.S. Environmental Services	Soils
Patsy Friend		Document Management and Production
Heidi Horner	B.A. English	Technical Editor
Steve Hicks	M.S. Environmental Science B.S. Wildlife and Fisheries Sciences	Wildlife Biology, Sage Grouse Surveys
Molly Humphreys	M.A. Interdisciplinary Studies, Historic Archaeology B.A. Anthropology	Cultural Resources

EIS CONTRACTOR POWER ENGINEERS		
NAME	**EDUCATION**	**INVOLVEMENT**
Brian Lathrop	B.S. Virtual Technology and Design M. Arch B. Arch	Visual Simulations
Steve Anderson	A.A.S., Applied Technology,	Visual Simulations
Kevin Lincoln	B.S. Resource Recreation and Tourism	Water Resources & Wetlands
Steve Linhart	M.B.A. B.S. Geography and Environmental Planning	Land Use, Transportation, Scoping Report
Melissa Lippincott	B.A. Environmental Studies	Special Status Plant and Noxious Weed Surveys
Jeff Maffuccio	B.S. Urban Planning	Transportation
Miles Mays	B.S. Civil Engineering	Engineering Support
Ken McDonald	B.S. Botany B.S. Environmental Biology	Wildlife Biology, Special Status Plant and Noxious Weed Surveys
Anne Mousseau	B.S. Electrical Engineering	Electric and Magnetic Fields
Sivasis Panigrahi	M.S. Electrical Engineering	Electric and Magnetic Fields
Rod Riehl	Engineering Support and Construction (25 years)	Construction Cost Estimating
Austin Streetman	B.S. Geology AS Computing Science	GIS Analyst
Mike Tatterson	B.S. Range Ecology	Soils
Trish Webb	B.A. Anthropology	Cultural Resources
Ryan Winkleman	B.S. Ecology and Evolutionary Biology	Wildlife Biology, Sage Grouse Surveys
Michel Ybarrondo	B.S. Geological Engineering	Geologic Hazards
EIS SUBCONTRACTOR ECONOMIC PLANNING RESOURCES		
NAME	**EDUCATION**	**INVOLVEMENT**
David Clark	M.S., Business Management; M.A., Economics; M.En., Environmental Sciences (35 years)	Socioeconomics and Environmental Justice

TABLE 6-3 PROJECT PROPONENT PREPARERS AND CONTRIBUTORS

PROJECT PROPONENT PACIFIC POWER		
NAME	**TITLE**	**INVOLVEMENT**
John Aniello	Project Manager	Project Administration
Stuart Kelly	Managing Director	Project Administration
Adam Lint	Transmission Engineer	Transmission Line Design Characteristics
Juan Luna Orozco	Senior GIS Analyst	GIS Support

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CHAPTER 7 LIST OF ACRONYMS AND ABBREVIATIONS

AADT	average annual daily traffic
ac	acre
AC	alternating current
ACEC	Area of Critical Environmental Concern
ACGIH	American Conference of Governmental Industrial Hygienists
ACHP	Advisory Council on Historic Preservation
ACP	asphalt concrete pavement
ACSR	aluminum conductor steel reinforced
ADA	Americans with Disabilities Act
AEC	Atomic Energy Commission
AG	agriculture
AMS	Analysis of Management Situation
APE	Area of Potential Effects
APLIC	Avian Power Line Interaction Committee
Army	U.S. Department of the Army
ATV	all-terrain vehicle
AUM	Animal Unit Month
B&O	Washington State Business and Occupation
BCAA	Benton Clean Air Agency
BG	Background
BLM	U.S. Bureau of Land Management
BMP	Best Management Practice
BPA	Bonneville Power Administration
BST	bituminous surface treatment
C, M, SP, & P	Chicago, Milwaukee, St. Paul and Pacific
C.F.R.	Code of Federal Regulation
CAA	Clean Air Act
CAO	Critical Areas Ordinances
CARA	Critical Aquifer Recharge Areas
CBCC	Cloudbase County Club
CCC	Commodity Credit Corporation
CCD	Census County Division
CCP	Comprehensive Conservation Plan
CDP	Census Designated Place
CE	cumulative effects
CEQ	Council on Environmental Quality
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide

CO_2(e)	carbon dioxide equivalent
COC	County Committees
CRP	Conservation Reserve Program
CT	Computer Tomography
CWA	Clean Water Act
DAHP	Washington Department of Archeology and Historic Preservation
dBA	A-weighted decibels
DC	direct current
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOI	U.S. Department of the Interior
DOT	U.S. Department of Transportation
DPS	Distinct Population Segment
DTM	Digital Terrain Mapping
DZ	Distance Zone
EDNA	environmental designation for noise abatement
EFSEC	Washington State Energy Facility Site Evaluation Council
EHS	extra high strength
EHV	extra high voltage
EIS	Environmental Impact Statement
EJ	Environmental Justice
ELF	extremely low frequency
EMF	electric and magnetic fields
EPA	U.S. Environmental Protection Agency
EPRI	Electric Power Research Institute
ERMA	Extensive Recreation Management Area
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
˚F	Fahrenheit
FAA	Federal Aviation Administration
FCC	Federal Communication Commission
FCRTS	Federal Columbia River Transmission System
FERC	Federal Energy Regulatory Commission
FFC	Federal functional classifications
FG	Foreground
FHWA	Federal Highway Administration
FLPMA	Federal Land Policy and Management Act of 1976
FPPA	Farmland Protection Policy Act
FRCC	Fire Regime Condition Class
FSA	Farm Service Agency

G	Gauss
GAP	Gap Analysis Data
GIL	Gas Insulated Line
GIS	Geographic Information Systems
GMA	Washington State Growth Management Act
GMU	Game Management Unit
GPO	Goals, Policies and Objectives
GPS	Global Positioning System
HCN	Health Council of the Netherlands
HPFF	high pressure fluid filled
HPTP	Historic Properties Treatment Plan
HRNM	Hanford Reach National Monument
HTS	high temperature superconductors
Hz	hertz
IARC	International Agency for Research on Cancer
IBA	Important Bird Area
IBC	International Building Code
ICES	International Committee on Electromagnetic Safety
ICNIRPD	International Commission on Non-iodizing Radiation Protection
IEEE	Institute of Electrical and Electronics Engineers
IFG	immediate foreground
IITRI	Illinois Institute of Technology Research
IM	Instruction Memorandum
IOP	Inventory Observation Points
IPCC	Intergovernmental Panel on Climate Change
IRP	Integrated Resource Plan
JARPA	Joint Aquatic Resources Permit Application
JBLM YTC	Joint Base Lewis-McChord Yakima Training Center
kcmil	kilo-circular mils
KOP	Key Observation Point
kV	kilovolt
kV/m	kilovolt per meter
LAMIRD	limited area of more intensive rural development
Ldn	day-night sound level
Leq	equivalent sound level
LGFRS	Local Government Financial Reporting System
LPP	laminated polypropylene paper
mA	milliampere
MA	Management Area
MBTA	Migratory Bird Treaty Act

MCL	Maximum Containment Level
mG	milligauss
MG	middleground
mg/L	milligrams per liter
mg/m3	milligrams per cubic meter of air
MHz	megahertz
mi	mile
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MP	milepost
MPE	Maximum Probable Earthquake
mph	miles per hour
MRI	Magnetic Resonance Imaging
MW	megawatt
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAIP	National Agriculture Imagery Program
NAS	National Academy of Sciences
National Register	National Register of Historic Places
NCSS	National Cooperative Soil Survey
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
NESC	National Electrical Safety Code
NHL	National Historic Landmark
NHPA	National Historic Preservation Act
NIEHS	National Institute of Environmental Health Sciences
NIFTT	National Interagency Fuels, Fire, and Vegetation Technology Transfer
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NOP	National Organic Program
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List
NPS	National Park Service
NRC	Nuclear Regulatory Commission
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places

NRPB	National Radiological Protection Board of Great Britain
NSA	Noise Sensitive Area
NTAC	Northwest Transmission Assessment Committee
NTSB	National Transportation Safety Board
NWI	National Wetland Inventory
NWPP	Northwest Power Pool
NWR	National Wildlife Refuge
O&M	Operation and Maintenance
O_3	Ozone
OATT	Open Access Transmission Tariff
OFM	Office of Financial Management
OHV	off-highway vehicle
OPGW	fiber optic ground wire
ORR	outstandingly remarkable resource
ORV	outstandingly remarkable value
OSHA	Occupational Safety and Health Administration
PA	Programmatic Agreement
Pb	Lead
PCCP	Portland cement concrete pavement
PF	Project Facilities
PHS	Priority Habitats and Species
PLSS	Public Land Survey System
PM	particulate matter
PM10	particulate matter <10 microns
PM2.5	particulate matter <2.5 microns
POD	Plan of Development
POWER	POWER Engineers, Inc
ppb	parts per billion
ppm	parts per million
PRD	Public Recreation Development
Project	Vantage to Pomona Heights 230 kV Transmission Line Project
PSD	Prevention of Significant Deterioration
PTBA	Public Transportation Benefit Areas
PUD	Public Utility District
R/ELDP	Remote/Extremely Limited Development Potential
Reclamation	U.S. Bureau of Reclamation
RM	Resource Management
RMIS	Recreation Management Information System
RMP	Resource Management Plan
RNA	Research Natural Area

ROD	Record of Decision
ROW	Right-of-Way
SCFF	self-contained fluid filled
SDP	Substantial Development Permit
SEPA	Washington State Environmental Policy Act
SF_6	sulfur hexafluoride
SHPO	State Historic Preservation Office
SLRU	Sensitivity Level Rating Unit
SMA	Special Management Area
SMP	Shoreline Management Plan
SO_2	Sulfur dioxide
sq. ft.	square feet
SQRU	Scenic Quality Rating Unit
SR	State Route
SRMA	Special Recreation Management Area
SS	Seldom Seen
STIP	Statewide Transportation Improvement Program
SWPPP	Stormwater Pollution Prevention Plan
TA	Training Area
TCP	traditional cultural property
TIP	Transportation Improvement Program
TSP	total suspended particulates
U.S.	United States
U.S.C.	United States Code
UGA	Urban Growth Areas
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USHPA	U.S. Hang Gliding and Paragliding Association
V/m	volts per meter
VPH	Vantage-Pomona Heights
VRI	Visual Resource Inventory
VRM	Visual Resource Management
WAAQS	Washington Ambient Air Quality Standards
WAC	Washington Administrative Code
WDA	Workforce Development Area
WDAHP	Washington Department of Archeology and Historic Preservation

WDES	Washington Department of Employment Security
WDFW	Washington Department of Fish and Wildlife
WDGER	Washington Division of Geology and Earth Resources
WDNR	Washington Department of Natural Resources
WDOE	Washington State Department of Ecology
WDOR	Washington Department of Revenue
WECC	Western Electricity Coordinating Council
WFO	Wenatchee Field Office
WHO	World Health Organization
WHO	World Health Organization
WISAARD	Washington Information System for Architectural and Archaeological Records Data
WNHP	Washington Natural Heritage Program
WO	BLM Washington, D.C. Office
WRCC	Western Regional Climate Center
WRIA	Water Resource Inventory Area
WSA	Wilderness Study Area
WSDOT	Washington State Department of Transportation
WSR	Wild and Scenic River
XLPE	Cross-Linked Polyethylene
YCC	Yakima County Code
YFC	Yakima Firing Center
YNCRP	Yakama Nation Cultural Resource Program
YRCAA	Yakima Regional Clean Air Agency
$\mu g/m^3$	micrograms per cubic meter of air
μV/m	microvolt per meter

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8.1 CHAPTER 1 PURPOSE AND NEED

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8.3 VEGETATION AND SPECIAL STATUS PLANT SPECIES

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